THE AMERICAN
JOURNAL OF PHARMACY

JUNE, 1896.

THE PHARMACOPŒIAL STANDARD.[1]

By J. U. Lloyd.

In introducing this subject, I realize that I am stepping on rather dangerous ground, because whoever presumes to touch upon the matter in a spirit of a somewhat adverse criticism, is sure to be severely scolded, and, as I admit, for good reasons.

Experts have given their time freely to the construction of that monumental work, the U. S. Pharmacopœia, and as a result, standards of unexceptional value were established. It seems evident that the aim was to make the work as precise and thorough as possible, and this herculean task was indeed performed to the credit of the committee and the admiration of the pharmaceutical world at large. It might, therefore, had not new questions been interjected, be considered as insisting on a backward course, if the feasibility of maintaining the pharmacopœial standard is questioned. Still, in my surroundings at least, conditions have arisen which have developed the curious fact that the very precision and thoroughness of the Pharmacopœia may furnish a source of hardship to those whom it was intended to aid, on account of its being looked upon as the legal code by persons who are appointed to enforce laws regulating the purity of drugs. In my opinion, a vital oversight was, therefore made, in not qualifying a large number of these exacting descriptions, which in many cases, as I see the matter now, were from one side too precise and in others were applicable only to preparations at one point of their existence and at no other. Hence,

[1] Thanks are hereby extended to Dr. Sigmond Waldbott for detail assistance. J. U. L.

the writer undertakes the responsibility of pointing in a general way to what may, under present conditions, be considered as defects and oversights, but which have not heretofore had an existence.

The substance under consideration may be divided into three classes, a few specimens of each being herein mentioned, and remarked upon as follows:

(1) It is evident that in many cases the intent was not to give standards that must be maintained in commerce, but to indicate what will be the condition of a substance when freshly and exactly prepared. As examples of substances that will illustrate this phase of the subject, I will call attention to Class A, to follow, embracing preparations that begin to change immediately and continue to alter with greater or less rapidity according to circumstances.

(2) Preparations in which the qualities demanded by the pharmacopœial descriptions are such as to render their production impractical or unnecessarily expensive, as shown by Class B, to follow.

(3) Substances used largely in the arts that the demands of commerce, necessities of manufacture or custom have established of qualities different from the standard of the U. S. P. In such cases, as shown by Class C, if no great advantage accrues from the pharmacopœial quality, it is questionable as to whether it is wise to demand a pharmacopœial strength different from that already established in commerce, or different from that established by the preceding Pharmacopœias.

CLASS A.

(1) *Liquor Sodæ Chloratæ* (Labarraque's Solution).

"An aqueous solution of several chlorine compounds of sodium, containing at least 2·6 per cent. by weight of available chlorine."—U. S. P., 1890.

A lot was prepared October 12, 1895, according to the direction of the U. S. P., kept well stoppered and protected from light; it was tested at different periods, with results as follows:

	Per Cent. Available Chlorine.
October 12, 1895	2·56
October 14, 1895	2·22
October 24, 1895	2·09
January 20, 1896	1·87
May 6, 1896	1·78

These results would indicate that the decrease in strength is not constant, but is most rapid at first, and that the preparation gradually approaches a state of equilibrium.

(2) *Liquor Plumbi Subacetatis* (Goulard's Extract).

"An aqueous liquid, containing in solution about 25 per cent. of lead sub-acetate (approximately $Pb_2O(C_2H_3O_2)_2 = 546.48$)."—U. S. P., 1890.

A batch prepared as directed by the U. S. P., 1890, contained at different periods:

	Per Cent. Basic Salt.
April 17, 1895	25·19
September 26, 1895	23·40
February 10, 1896	23·04
May 7, 1896, sample	22·99
May 7, 1896, bulk	22·94

These results would suggest the same conclusion as drawn in the case of Labarraque's solution:

(3) *Acidum Sulphurosum* (Sulphurous Acid).

"A liquid composed of not less than 6·4 per cent., by weight, of sulphurous acid gas (SO_2) and not more than 93·6 per cent. of water."—U. S. P., 1890.

Two lots were examined:

	Per Cent. SO_2.
(A) One gallon, tested on December 10, 1895, showed	6·55
Same, tested on January 31, 1896, showed	6·38

The fluid had been placed in a stone jug, the latter securely stoppered with a paraffined cork, put into a cool place and had never been opened in the interim. The decrease in strength, amounting to 2·6 per cent. of the SO_2 originally present, cannot be due altogether to oxidation caused by air contained in the solution, for a simple calculation will demonstrate that were the solution saturated even with oxygen at 15° C., this amount could oxidize at most but 0·3 per cent. of the SO_2 originally present.

(B) A two-gallon lot in stone jug, closed securely by a cork. A small part of it was withdrawn on a purchase prior to March 5th. On March 8th, it was poured into three 5-pint glass-stoppered bottles, the stoppers having been previously dipped into melted paraffine, was tested immediately after filling, and again on May

15th, after 1 pint had been withdrawn from each under ordinary conditions.

The following table shows the decrease in strength under the manipulations described:

	Per Cent. SO_2.
Stone jug, February 3, 1896	6·67
May 5, 1896	6·08

	May 8th. Per Cent. SO_2.	May 15th. Per Cent. SO_2.
Bottle I.	5·92	5·62
" II.	5·89	5·57
" III.	5·80	5·62

These results will tend to show that notwithstanding the precautions directed, sulphurous acid, although originally slightly above the standard prescribed by the U. S. P., 1890, will, upon standing in vessels securely closed by corks, fall below thats tandard, and this decrease is accelerated by the dispensing of the preparation. In warm weather, the evolution of gas is very rapid and the pressure exerted will even throw out the cork.

(4) *Aqua Ammoniæ Fortior* (Stronger Ammonia Water.)

"An aqueous solution of ammonia ($NH_3 = 17·01$), containing 28 per cent., by weight, of the gas."—U. S. P., 1890.

Three 1-pound samples in their original packages from different sources (*A* and *B*) were, in each case, freshly opened, and examined with results as follows:

	Per Cent. NH_3	Per Cent.
(A) January 31st, average	26·5	(26·7 and 26·3)
May 6th, average	25·54	(25·34, 25·71, 25·57)
(B) May 6th, average	26·61	

In the case of *B*, the original bottle was closed with a rubber stopper. In the case of *A*, it was closed with a cork stopper, protected by tinfoil.

The deviations from the U. S. P. standard, it is seen, are slight, but distinct, and undoubtedly unintentional.

(5) *Spiritus Ammoniæ.*

"An alcoholic solution of ammonia ($NH_3 = 17·01$), containing 10 per cent., by weight, of the gas."—U. S. P., 1890.

Two quart specimens were examined. Both were contained in glass-stoppered bottles, the glass stoppers having been previously

dipped into melted paraffine. One pint was removed on a purchase on January 8th; the remainder was tested and kept as described.

		Per Cent. NH_3.
(Quart A)	On December 11, 1895, it contained	10·47
	On January 8, 1896, it contained	10·21
	On May 6th it assayed	9·50
(Quart B)	On December 11, 1895, it contained	10·47
	On May 6, 1896, it contained	9·56

These experiments would demonstrate that spirit of ammonia of the aforenamed strength, protected against evaporation as securely as before described, will gradually lose in strength, even though the bottle has not been opened (case *B*), and the use of paraffine in connection with glass stoppers does not offer sufficient or absolute safeguard against slow evaporation of the gas. Still, the amount that escaped was so small that there was not, at any time, a smell of ammonia noticeable around the stopper, nor could a cloudiness be seen when a drop of strong HCl was held near it.

(6) *Aqua Ammoniæ* (Ammonia Water.)

"An aqueous solution of ammonia ($NH_3 = 17·01$), containing 10 per cent., by weight, of the gas."—U. S. P., 1890.

It was herein aimed to ascertain: (1) how much gas ammonia water will lose when insufficiently protected; (2) how much it will lose under the opposite conditions.

The percentage herein recorded refers to grammes of NH_3 in 100 c.c. of the fluid. One quart of ammonia water was operated upon.

	Per Cent. NH_3.
On May 17, 1895, its strength was	9·46
On May 21st, bottle covered with paper only	9·22
On May 24th, same	8·22

The specimen was now divided into two pints (*A* and *B*).

A was kept in a glass-stoppered bottle, sealed hermetically with paraffine. *B* was kept in a bottle loosely covered with a cork, which was simply laid over the mouth of the bottle.

	A. Per Cent. NH_3.	B. Per Cent. NH_3.
May 24, 1895	8·22	8·22
June 3, 1895	8·12	7·81
June 15, 1895	8·09	7·74
August 23, 1895	8·13*	6·65
May 6, 1896	7·84	4·83

*Evidently error of manipulation, which, unfortunately, was not corrected.

These results, in part, seem to confirm those obtained in the case of spirit of ammonia, inasmuch as the use of paraffine in connection with glass-stoppered bottles does not completely prevent the escape of ammonia. The loss is not so marked in this case, probably because the percentage (8·15 per cent. by volume) is lower than in the case of the spirit of ammonia, which was 10·47 per cent. by weight.

It will be observed that such substances as those herein enumerated, under class A, must necessarily deviate from the pharmacopœial standard. The question to be determined is what latitude should be permitted, a point upon which the writer has purposely aimed not to commit himself, as it would manifestly be out of place for him to do so. In the case of some members belonging to this class, *e. g.*, Labarraque's solution and Goulard's extract, the rate of deterioration as shown by these experiments is rapid at first, but decreasingly so thereafter, and yet other shop conditions might give different results. Spirit of nitrous ether is a conspicuous member of this class, but is not reported herein, as the writer hopes to make that substance the subject of a special paper for another occasion.

CLASS B.

A representative of this class of substances may be sufficient to cite:

Liquor Ferri Subsulphatis (Monsel's solution) and *Liquor Ferri Tersulphatis* (solution of ferric sulphate).

The direction given by the U. S. P. for making these preparations must be considered rather vague and indistinct if the finished product should conform to the tests which immediately follow them. For example, the boiling liquid may be "free from nitrous odór," and still not stand the test for the absence of nitric acid demanded subsequently.

These tests may be construed to demand the strict absence of both an excess of nitric acid and ferrous salt, a demand not easily complied with; for while it is an easy matter to entirely exclude either, leaving a slight excess of the other, it is impractical, to say the least, to exclude them both to that exactness which the wording of the tests of the U. S. P. implies. In our experience it has occurred that the liquid, holding in solution a slight yet perceptible excess of ferrous salt and a very slight excess of nitric acid, still showed reaction for both substances after prolonged boiling.

CLASS C.

(1) *Calx Chlorata* (Chlorinated Lime.)

"A compound containing not less than 35 per cent. of available chlorine."—U. S. P., 1890.

Two samples of commercial chlorinated lime (A and B) are reported as showing the probable variations in this substance:

	Available Chlorine.	
	Per Cent.	Per Cent.
(A) October 11, 1895, average	20·51	(20·45 and 20·57)
(B) May 8, 1896, average	31·47	(31·22 and 31·72)

While pharmacopœial chlorinated lime should seemingly be easily obtained, the writer has experienced difficulty in getting it of anything like a uniform quality, and probably this is the experience of others.

(2) *Calx Sulphurata* (Sulphurated Lime.)

"A mixture containing at least 60 per cent. of calcium monosulphide (CaS = 71·69)."—U. S. P., 1890.

By applying the tests indicated in the U. S. P. to two samples from two different manufacturers, the following results were obtained:

A contained less than 30 per cent. of CaS.

B contained more than 30 per cent., but less than 45 per cent. of CaS.

In this direction it may be said that all attempts to obtain this preparation of pharmacopœial quality were ineffectual. Indeed, one authority stated that, owing to danger from spontaneous combustion, no effort would be made to produce it. The fact remains, the increase of the pharmacopœial requirements has not resulted in an increased valuation of the preparation.

(3) *Caustic Potash.*

"90 per cent. KOH."—U. S. P., 1890.[1]

Efforts were made to secure caustic potash which would meet the requirements of the U. S. P., and the following results were obtained:

[1] The U. S. P., 1890, gave no standard for caustic potash sticks. The present U. S. P. standard, established 1880, conforms also to the German Pharmacopœia, 3d edition.

	Per Cent. KOH.
October 1, 1895, fresh opened bottle, (a)	80·95
October 1, 1895, fresh opened bottle, (b)	80·91
October 4, 1895, different sticks of another bottle	75·35
	77·98
	76·29
	77·24
December 9, 1895, new pound-bottles	74·96
	74·93
December 10, 1895, bulk, thick sticks	89·60
January 23, 1896, new lot, bulk, thinner sticks	86·02
	86·08
February 20, 1896, 10-pound can	82·74
February 24, 1896, sample	76·50

(4) *Caustic Soda* —"90 per cent. NaOH."—U. S. P.

	Per Cent. NaOH
October 11th, from bulk, hard sticks	85·54
October 11th, same, soft surface	82·77
February 20th, pound bottles	91·8

These experiences will tend to show that manufacturers of such chemicals as caustic potash, find difficulties in supplying products which will meet the requirements of the U. S. P., or else do not wish to disturb the preparation demanded in trade, and are especially indifferent in cases such as chlorinated lime, where the standard given by the previous edition of the Pharmacopœia has been raised in the subsequent edition.

And still another class of variations should, in the opinion of the writer, be recognized, notwithstanding that in this direction many persons will assuredly differ. A certain liberal allowance should be made for deviations that result in the manipulation of simple pharmacopœial preparations. In the opinion of the writer, apothecaries should not be held to the exactness that follows the manipulation of expert analysts, or men who have every facility for precision. Even such preparations as tinctures, solutions, syrups and other preparations of a similar nature made by apothecaries should be permitted to vary within proper restrictions. The physician cannot prescribe these with any certainty when it comes to distinguishing between the effects of doses that vary in moderate amounts, and conditions exist in different drug stores that render it improbable in the mind of the writer that ordinary care can prevent marked variations from exact analytical standards.

Be it understood that no countenance is suggested herein for adulteration, sophistication, ignorance, or for carelessness of manipulation; only a plea is made for liberality towards those members of the pharmaceutical profession who aim conscientiously to do justice to their patrons, who use proper care in manipulations, but who cannot, and in the writer's opinion should not be asked to, meet too rigid requirements.

Conclusion.—In closing, the writer will state that he believes that while in behalf of the druggist a scale of reasonable variations should be affixed by the pharmacopœial committee to every pharmacopœial preparation, it is no less a matter of justice in behalf of those whose duty it is to enforce the food and drugs laws. These men should not be required to determine this question. To place this responsibility upon them is to establish as many different standards as there are officers, or else, if any so insist, to demand that these preparations be kept exactly according to the pharmacopœial standard, which means to require of apothecaries more than mortal man can accomplish.

A METHOD OF ASSAY FOR SANGUINARIA AND ITS PREPARATIONS.

By Charles H. LaWall.

The recent introduction of standardized drugs and their corresponding preparations has stimulated investigation along lines which are practically new, and the Pharmacopœia of twenty years hence will probably have a standard for each drug which contains some characteristic and therapeutically valuable constituent, together with the process of estimation best suited to the particular case at hand.

At the present time many investigators are devoting their time to this work, and scarcely a month passes but some new drug has a process proposed for the estimation of its active constituent (generally an alkaloid), together with the results obtained by the application of the process to a number of commercial samples of the drug for the purpose of fixing a standard.

Already many drugs have been studied in this manner, with the result that a number of manufacturers of pharmaceutical prepara-

tions have adopted standards for these drugs. These standards may not be absolutely correct as to the amount of alkaloid actually present; but certain it is that, when a drug assays a given per cent. of crude alkaloid by any process, and the fluid extract made from it, when assayed by the same process, contains the same percentage or slightly less, the drug has been thoroughly exhausted and thus a double check is kept upon work which formerly was far from uniform.

Sanguinaria is among those drugs which have had but little attention paid to them in this respect, and but one or two manufacturers standardize the preparations made from it.

Several of the general assay processes which are coming into such widespread use were applied to sanguinaria by the author of this paper, with the expectation of obtaining results which would permit the standardization of preparations made from it. The results were satisfactory for the purpose of standardization, which was the proximate object of the work, but while there were points of difference noticed between the alkaloidal constituents of the drug, no definite statement can be made as to the relations of these constituents as determined in the process used for assay.

The processes used in the experiments performed by the author were those based upon digestion of the ground drug, or its preparation, for a given length of time with certain solvents, in the presence of an excess of ammonia, subsequent separation of the alkaloid being effected by the use of immiscible solvents. The application of this process in general has been widely increased of late by the work of Messrs. Keller, Beckurts, Nagelvoort, Dohme, Kebler, Caspari, and others. No names will be applied to the processes hereafter described, but they will be designated by numbers instead.

The methods used were as follows:

No. 1.

Drug (No. 50 powder)	10 grammes.
Light chloroform ether[1]	100 "
Aqua ammoniæ	10 "

Macerate for four hours with frequent agitation; then add 5 grammes additional of aqua ammonia; shake well and separate the quantity required for assay.

[1] Light chloroform ether consists of 3 volumes ether and 1 volume of chloroform.

No. 2.

Drug (No. 50 powder) . . . . . 10 grammes.
Ether . . . . . 100 "
Aqua ammoniæ . . . . . 10 "

The succeeding steps of this process are the same as in No. 1.

No. 3.

Drug (No. 50 powder) . . . . . 10 grammes.
Prollius' fluid . . . . . 100 c.c.

Lyons' General Assay Process No. 1, taken from *Pharmaceutical Assaying*.

No. 4.

Drug (No. 50 powder) . . . . . 10 grammes.
Petroleum benzin . . . . . 100 "
Aqua ammoniæ . . . . . 10 "

Proceed same as No. 1 and No. 2.

The results obtained by these processes were as follows:

Process Used.	Solvent Used for Second Extraction.	Per Cent. of Alkaloid.	Color.
No. 1 . . .	Heavy chloroform ether[1]	4·86	White.
No. 2 . .	Ether	5·12	White.
No. 3 . . .	Heavy chloroform ether	6·06	Dark.
No. 4 . . .	Heavy chloroform ether	1·48	White.

[1] Heavy chloroform ether consists of chloroform 3 volumes and ether 1 volume.

The low results obtained in No. 4 were at first looked upon as being incorrect, but a repetition of the process afforded the same results.

A combination of processes Nos. 1 and 4 was then tried. This showed that the benzin exerted a solvent action upon only a portion of the alkaloid present, and gave constant results with the same sample; a subsequent extraction of the residue with light chloroform ether removed the remainder of the alkaloid, and gave results for total extraction agreeing within a small fraction of 1 per cent.

A sample of the ground drug was carefully assayed, using the benzin process, and contained 1·68 per cent. alkaloid. A fluid extract was then prepared from the same drug, using the process in

the United States Pharmacopœia for 1890. The fluid extract, when assayed by the same method, contained 1·67 per cent. alkaloid, thus proving that the process used in making the fluid extract had thoroughly exhausted the drug.

The alkaloid extracted by benzin was examined in comparison with that subsequently extracted by chloroform, ether, with no definite results regarding their distinction.

Both melted at precisely 160° C.[1] when obtained in scales from the evaporation of an ethereal solution. Both showed a violet coloration with sulphuric acid and potassium bichromate, and showed a reddish purple fluorescence in ethereal solution. The hydrochloric acid salt of each was prepared, and was found to be of a bright red color, but no difference could be observed in their reactions.

The process, which had thus far been tried only upon the commercial drug, was then applied to some sanguinaria collected by the author on May 6, 1896, and dried at 60° C. to expel moisture, which amounted to 86·50 per cent. Assayed by the benzin process, it yielded 1·30 per cent. of alkaloid; this is slightly lower than in any sample of commercial drug examined, but may be due to the time of collection, which should be in autumn, according to the United States Pharmacopœia.

The same tests were applied to the alkaloids in this case, with similar results to those obtained previously.

A volumetric titration of the alkaloids was attempted, but was unsuccessful, owing to the deep red color of the salts of the alkaloid, which interfered with the accuracy of the indicator.

The following conclusions were drawn from the application of these processes to the drug and its preparations, working upon a practical scale:

(1) That the benzin process gives uniform results with any given

---

[1] The following melting points have been ascribed to these alkaloids by well-known authorities:

Sanguinarine, 211° C.; Chelerythrine, 203° C.; by G. König, 1891. *Chemische Centralhalle.*

Sanguinarine, 160° C.; Allen, *Com'l Org. Anal.*, Vol. III, part II.

Sanguinarine, 160° C.; H Nasehold; *J. Prakt. Chem.*, cvi, 385.

Sanguinarine, 213° C.; *Ladenburg Handwörterbuch.*

sample of the drug and the preparations made from it, and may be used for standardization.

(2) That 1·50 per cent. may be considered as the average alkaloidal content of the commercial drug by the benzin process.

305 CHERRY STREET, PHILADELPHIA.

RECENT LITERATURE ON THE SOJA BEAN.

BY HENRY TRIMBLE.

The immediate excuse for the appearance of this paper is the fact that a number of contributions have recently appeared on the soja bean, notably from the College of Agriculture, Imperial University of Japan. Soja hispida, Mœnch (Glycine hispida, Maximowicz), is an annual leguminous plant of India, China and Japan, where the bean and its products constitute an important proportion of the food of the populace. Wherever rice forms the principal food for man, as in Japan and China, an addition of some other food richer in proteids is necessary, in order to make up the deficiency in the rice. The inhabitants of these countries near the seacoast supply this want by the use of marine animals, while the inland people subsist on the seeds of various leguminous plants, especially the soja bean. Beef and other kinds of meat have only come into use in recent times. The following analyses indicate the reasons for the popularity of the soja bean in countries where nitrogenous food is in demand:

	1.	2.	3.	4.	5.
Crude protein	38·69	31·21	34·92	33·36	42·05
Fat	17·87	18·29	15·53	21·89	20·46
Crude fibre	12·69	12·78	12·81	—	4·53
Starch	3·49	3·51	3·53	—	—
Ash	5·39	5·63	5·97	5·35	4·19
Other organic matters	21·01	28·09	26·53	34·18	28·82

Sample No. 1 was from China, No. 2 from Hungary, No. 3 from France, and all were analyzed by Pellet (*Compt. rend.*, **90**, 1077); No. 4 was analyzed by Güssmann (*Chem. Centralb.*, 1890, p. 133); and No. 5 was from Japan, analyzed by O. Kellner (*Bulletin Imperial College of Agriculture*, Vol. 1, No. 2). The most important food constituent is the protein, but what is of still more interest to pharmacists is the presence of an active diastatic enzyme, said by

Stingl and Morawski (*Chem. Centralb.*, 1886, p. 724) to be present in the soja bean to a greater extent than in many other leguminous seeds.

This ferment is said to have a powerful action upon starch, two-thirds of which it converts into sugar, and one-third into dextrin.

Güssmann has determined that 90 per cent. of the soja protein, 89·8 per cent. of the fat, and 14·5 per cent. of the crude fibre are digestible.

According to E. Schulze (*Zeit. Physiolog. Chemie.*, **12**, 405), etiolated soja shoots contain as much as 7 to 8 per cent. of asparagine, as well as leucine, phenylamidopropionic acid, choline, and bases of the hypoxanthine groups, whilst the presence of arginine is uncertain. In this latter point the soja shoots differ from those of the lupines, which contain plenty of the arginine.

The oil may be extracted by pressure or by means of solvents; it is said to possess some laxative properties, is of a yellowish brown color, and has a slightly aromatic odor; it is intermediate between the drying and non-drying oils. The following properties are given by Stingl and Morawski (*Chem. Zeit.*, 1886, p. 140):

Specific gravity at 15°	0·924
Point of solidification	8° to 15°
Fusing point of fatty acids	27° to 29°
Point of solidification of fatty acids	23° to 25°
Temperature rise	59°
Iodine number,	121·3
Iodine number of fatty acids	122·0
Saponification number	192·5

The starch found by Pellet and Güssmann was not found by Kellner, and this absence has been more recently confirmed by Inoyue (*Bull. Imp. Coll. Agriculture*, Vol. 2, No. 4); this freedom from starch has repeatedly led to the suggestion that soja meal be used in making bread for diabetics.

Levallois (*Compt. rend.*, **93**, 281) found a sugar in soja bean which, on precipitation by ether from its alcoholic solution, forms a very deliquescent mass; it does not reduce Fehling's solution, ferments readily with yeast, and is converted by oxidation with nitric acid into mucic and oxalic acids.

The thrifty Japanese have not been slow in availing themselves of a food so readily cultivated and so rich in proteids as to form a valuable adjunct to their rice. The drawbacks of the soja bean are

its indigestibility, and, when dry, slow yielding to the cooking process. In order to overcome these difficulties, there have been prepared in Japan since the remote times when the soja bean was first used, at least three products, *miso*, *natto* and *tofu*, in the manufacture of which the aim is to produce an easily digestible and nutritious food.

The first of these, *miso*, as described by Kellner (*Bulletin of the Imperial College of Agriculture*, Vol. I, No. 6, and *Chem. Zeit.*, **19**, 97. 120 and 265), is made on a large scale in special factories and on a small scale in private families. The first step in this preparation is the manufacture of *koji*, a diastatic ferment, from rice or barley. The rice is steamed until the form of the grain is not quite destroyed or the starch cells fully burst. It is then spread on straw mats and allowed to cool to 28° C. Spores of the mould Aspergillus oryzae are then mixed with the rice and the mass placed in a room at 20° C. for twenty-four hours, during which time the temperature rises to 40° C. It is then divided into small portions and placed in a warm part of the cellar for twelve to twenty-four hours, when it is well kneaded and allowed to cool; the latter is hastened by the addition of cold water, if necessary. In about three days from the steaming of the grain, the process is completed and the rice is permeated with a fine mycelium; the product is *koji*. The *miso* is then made by taking 5 parts of soja beans, 3 to 6 parts of rice or barley *koji*, 1½ to 2 parts salt and 1 part water. The beans are steamed and broken up, mixed with salt and water and the *koji* added to the cooled mixture. The procedure then depends somewhat upon whether the *miso* is needed soon or not. The temperature regulates the rapidity of the process, and if there is no particular haste required, it is maintained as low as possible. The finished product is a stiff, brownish-red porridge, of a variable composition, containing as much as 50 per cent. of water, 1 per cent. of alcohol and some free acid. There are at least four varieties of *miso*, varying in the time required in their manufacture from three or four days to one and one-half years.

Natto is prepared by boiling the beans in water for four or five hours, until they are perfectly soft. The mass, while still hot, is wrapped in straw, and the bundles thus formed, when well tied at both ends, are placed in a cellar, in the middle of which a fire is kindled, whereupon the cellar is well closed. The heat is left to act

for twenty-four hours, after which the product is ready for consumption. Although the moderate heat of the cellar acts for only twenty-four hours, still there is considerable bacterial growth going on. The product has a peculiar, but not putrid odor. K. Yabe (*Bulletin of Imp. College of Agriculture*, Vol. 2, No. 2) found in this substance four kinds of microbes present, and he believes the chemical decomposition of the proteids to be due to one or more of these microbes. In Japan this *natto* is regarded as a vegetable cheese. A chemical investigation by the author just mentioned revealed tyrosin, peptone, guanine, leucin and xanthine. The total proteids amounted to considerably more in the *natto*, when allowance was made for increase of moisture, than existed in the original bean, and the artificial product is also considered to be much more digestible.

A still more interesting preparation of the soja bean than either of the preceding is *tofu*. This has been described and investigated by M. Inouye (*Bulletin Imp. College of Agriculture*, Vol. 2, No. 4). The beans are first soaked for about twelve hours in water, and then crushed between two millstones until a uniform pulpy mass is obtained. This is then boiled with about three times its weight of water, and filtered through cloth. The liquid filtrate is white and opaque, very closely resembling cow's milk, while the odor and taste remind one of fresh malt. On standing, the liquid becomes sour from the formation of lactic acid, and a coagulation of the casein takes place. The freshly boiled and filtered liquid is coagulated either by the addition of a portion of the sour liquid which has been set aside from a previous lot, or it is treated with about 2 per cent. of a concentrated brine, such as is obtained as mother liquor from the preparation of sea salt. In either case, the addition of the precipitant causes the separation of a flocculent substance, which soon coagulates, and is collected on a cloth filter, slowly pressed, and then cut into tabular pieces of about 150 grammes each. These, when dipped in a mixture of turmeric and brine, are ready for consumption. Only about one-fourth of the total amount of the proteids in the original beans is recovered in the *tofu*. This vegetable casein is not precipitated from the milky liquid by the sodium chloride of the brine, but by the magnesium and calcium chlorides. Calcium nitrate or magnesium sulphate will produce the same result, although an excess of the latter must be avoided or the pre-

cipitate would re-dissolve. *Tofu* is manufactured only on a small scale, by people who sell it in their own shops.

Kori dofu is another form of *tofu*, made by exposing the tablets of the latter to the action of frost, whereby they shrink considerably, lose water and become more compact. The Chinese preparation, *tao-hu*, is similar to, or, perhaps, identical with, *tofu*. Several other preparations of soja bean are known in India, China and Japan, most of them prepared, no doubt, with the object of making them more digestible. The celebrated *shoyu* or *soy*, a bean sauce, is a product said to be made from soja bean, although it is probable that the small variety, Phaseolus radiatus, is used for this purpose.

Somewhere about the year 1888 the soja bean was introduced into the United States. It has been tried in a number of State Experiment Stations, and is gradually working into favor in the Southern States. In Kansas the plant has been found to withstand considerable drought. The beans are planted in drills, 2½ to 3 feet apart, and 1½ to 2 inches apart in the rows. The plant attains a height of 3 to 4½ feet, and bears the short pods thickly on the bushy plants. As soon as the beans commence to ripen, the plants are cut by mowing, and then threshed. The plant is valuable for forage or soiling. The beans have been produced in South Carolina to the amount of 10 to 15 bushels per acre. On account of their richness in oil they have been used as a substitute for cotton-seed meal in feeding cattle, with very satisfactory results.

The plant is believed to have, in common with most cultivated leguminosæ, the power of obtaining some of its nitrogen from the air, and hence, of acting as a soil renovator.

THE TANNINS OF SOME ERICACEÆ.

By Bertha L. DeGraffe, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 154.

It is a well-known fact that the natural order Cupuliferæ affords both of the kinds of tannin which are now conceded to exist. This classification of the numerous tannins is derived from the reasons that the qualitative reactions of the known tannins agree in the main with one or the other of two quite constant series of behaviors; that among their decomposition products but two classes of well-

defined compounds have been found; and that, for substances so difficult to isolate and purify, the percentage compositions indicated by ultimate analysis are sufficiently near to one or the other of two general molecular formulas as to make their agreement with one of these almost imperative.

But these principles have been classified with respect to other properties, even to the part they are supposed to play in the economy of plants. They are, therefore, often spoken of as pathological and physiological, the qualifying names which Wagner[1] applied in 1866 to the two divisions of his classification of the then known tannins according to the conditions under which they seemed to be present in the plant. The former term was intended to designate those tannins found on vegetable tissues, which had been injured by the sting of an insect, while to the latter division was assigned the great number of tannins present in normal or uninjured vegetable tissues. To exemplify these classes, the well-known gallotannic acid which is obtained from galls—the excrescences on the twigs and leaves of Quercus lusitanica, caused by the punctures and deposited ova of Cynips Gallæ tinctoriæ—was proposed for the one, and the tannin of oak bark, whose detection as a definite principle had been made 100 years before, offered for the other. But although these terms, pathological and physiological, have been used to distinguish two classes of tannins, investigation has not shown that the occurrence of gallotannic acid in vegetable tissue is in all cases under a pathological condition, for in some plants it has been proven to be the only tannin therein existing, and for this indisputable reason it must be looked upon as a physiological tannin. So it is now agreed that some of the tannins which occur in uninjured or normal vegetable tissue are identical with gallotannic acid. Notable among those which have been found to possess the same composition as gallotannic acid, and on that account have come into conflict with the proposed definitions of Wagner, are the tannins of sumac, chestnut wood and bark, pomegranate bark and cloves. Some observations of the most prominent members of the natural order Ericaceæ, which yield tannin-bearing medicinal drugs, led the author to believe this order to be a promising field for the investigation of the possible

[1] Beiträge zur Kenntniss und zur quantitativen Bestimmung der Gerbsäuren. *Zeit. anal. Chem.*, 5, 1.

occurrence of both kinds of tannin in the normal tissues of a single order, and to investigate this point the work discussed in this paper was undertaken. The most important of the drugs which this family of plants supplies were selected because of the interest attached to them in pharmacy and medicine. The official drugs uva ursi and chimaphila were investigated, and besides these, the leaves of gaultheria and of manzanita, the stems and leaves of mountain laurel, and the entire plant of trailing arbutus were examined in like manner. The origin of the drugs may be thus expressed:

Drug.	Origin.	Sub-Order.
Uva Ursi,	Arctostaphylos uva ursi,	Arbuteæ.
Gaultheria,	Gaultheria procumbens,	Andromedeæ.
Chimaphila,	Chimaphila umbellata,	Pyroleæ.
Manzanita,	Arctostaphylos glauca,	Arbuteæ.
Mountain laurel,	Kalmia latifolia,	Rhodoreæ.
Trailing arbutus,	Epigæa repens,	Ericineæ.

The uva ursi, manzanita and chimaphila were purchased in the drug market, and were, of course, in an air-dried condition, while the other drugs were of recent collection. These were allowed to become air-dried and were then ground. The method of extracting the tannin from the materials consisted in percolating the latter with acetone. The solvent was recovered from the percolate and the resulting semi-solid extracted matter was treated with water. Through this mixture paper pulp was suspended, and, after thorough agitation, these materials were poured upon a plug of cotton in a funnel. The filtrate which was obtained was then shaken with successive portions of acetic ether, as long as this solvent continued to remove tannin from the aqueous liquid. The different portions of acetic ether so applied were united, and the entire volume distilled under diminished pressure on a water-bath to dryness. To further purify the residues gotten by this means, they were treated with water, as were the semi-solid extracted matters from which they had been obtained. Paper pulp was likewise distributed through these solutions, and the resulting mixtures were poured upon cotton, as before. This treatment served to separate more of the resinous and other non-tannin substances, for, in all cases, the residues of tannin which were left upon recovering the acetic ether (by means of which they had been extracted from the aqueous liquids) showed a greater degree of purity than that possessed by

the first residues had in this manner. Repetitions of this treatment with water in the presence of paper pulp, and subsequent removal of the tannin from the water solution, were made with each of the tannins until no further change could be effected by its agency. When this repetitious treatment with water no longer caused a separation of non-tannin materials from the principles under consideration, these compounds were obtained in a porous or "puffed-up" condition upon the last recovery of the acetic ether. The tannins from this process of purification were of light reddish tinge in the cases of trailing arbutus, gaultheria and mountain laurel, while those from uva ursi, manzanita and chimaphila were of straw-yellow color.

In order to still further free the principles from closely associated resinous impurities, and also from acetous odors, they were thoroughly dried at 120° C., and, after allowing them to cool, treated with absolute ether. Besides this treatment, and prior to it, it was found necessary, in the cases of manzanita and chimaphila, to agitate the aqueous solutions of the tannin with ether—a method which was found to be more efficient for the separation of resinous substances than was the application of absolute ether to the completely dried substance. The drying of the tannins caused the development of a reddish-brown color in the principles from gaultheria, trailing arbutus and mountain laurel. This feature at once suggested their similarity to oak bark tannin, which assumes a red color under the same influence. The tannins from the several drugs, after having been purified by the above measures as far as it was found possible, were subjected to the following investigations, for the purpose of deciding their chemical characters and effecting their classification.

For the purpose of comparing the qualitative reactions of the several tannins with the known behaviors of typical representatives of the two classes of these principles now recognized, a 1 per cent. solution of each was tested with the reagents mentioned in the accompanying chart.

While the reactions obtained in the qualitative examination did not agree as closely as might be desired with those given by gall tannin or oak bark tannin, still, the general tendency of the reactions of the principles from manzanita and uva ursi was to resemble those of gall tannin, and the behavior of those from trailing arbutus, gaultheria, chimaphila and mountain laurel to resemble the reactions of

Reagent.	Chimaphila.	Trailing Arbutus.	Gaultheria.	Mountain
Copper Sulphate and Ammonium hydrate	Yellowish ppt.	Yellowish ppt.	Slight ppt.	Brownish p
	Slight ppt. and green color.	Dark green ppt.	Slight ppt.	Greenish-b
Pine wood shaving and Hydrochloric acid	No change.	Violet color.	Violet color.	Violet colo
Nitrous acid	Brown ppt.	Brown ppt.	Brown ppt.	Brown ppt.
Bromine water	Yellow ppt.	Yellow ppt.	Yellow ppt.	Yellow ppt
Ferric chloride and Ammonium hydrate	Brownish-green ppt.	Brownish-green ppt and color.	Green ppt. and color.	Brown ppt.
	Brown ppt.	Brownish-black ppt.	Purplish red ppt. and color.	Brown ppt.
Ammonio-ferric sulphate	Brown ppt.	Dark slate ppt.	Olive-brown ppt.	Brown ppt.
Calcium hydrate	Ppt. changing to pink on top.	Ppt. changing to pink on top.	Ppt. changing to pink on top.	Ppt. chan pink on t
Lead acetate	Yellow ppt.	Yellow ppt.	Yellow ppt.	Orange-yel
Potassium bichromate	Brown ppt. upon standing.	Brown ppt.	Reddish-brown ppt.	Orange-yel
Uranium acetate	Crimson color changing to brown ppt.	Crimson color and brown ppt.	Crimson color changing to brown ppt.	Crimson co brown p
Ferric acetate	Olive-brown ppt.	Dark slate ppt.	Brownish-green ppt.	—
Gelatin	White ppt.	Flesh-colored ppt.	Pinkish ppt.	Yellow ppt

	Mountain Laurel.	Manzanita.	Uva Ursi.	Gallotannic Acid.	White Oak Bark Tannin.
	Brownish ppt.	Brownish-yellow ppt	Yellowish ppt.	No ppt.	Ppt.
	Greenish-brown ppt.	Greenish-brown ppt.	Dark green ppt.	Brown ppt.	Brownish-green color.
	Violet color.	Violet color.	No change.	Slight green color.	Violet color.
	Brown ppt.	Brown ppt.	Brown color.	Brown ppt.	Brown ppt.
	Yellow ppt.	Brownish-yellow ppt	No ppt.	No ppt.	Yellow ppt.
r.	Brown ppt.	Brown ppt.	Slate-colored ppt.	Blue color and ppt.	Green color and ppt.
	Brown ppt.	Brown ppt.	Maroon ppt.	Purple ppt.	Purple-brown ppt.
	Brown ppt.	Olive-brown ppt.	Blue ppt.	Blue color and ppt.	Green color and ppt.
	Ppt. changing to pink on top.	Ppt. changing to pink on top.	White ppt., liquid becoming blue.	Ppt. turning blue.	Ppt. turning pink.
	Orange-yellow ppt.	Brownish-yellow ppt	Yellow ppt.	White ppt.	Yellowish ppt.
	Orange-yellow ppt.	Brown ppt.	Brownish-yellow ppt	Brown ppt.	Brown ppt.
}	Crimson color and brown ppt.	Crimson color changing to brown ppt.	Crimson color changing to brown ppt.	Crimson color and brown ppt.	Crimson color and brown ppt.
t.	—	Brownish-green ppt.	Green ppt.	Blue color and ppt.	Green color and ppt.
	Yellow ppt.	Flesh-colored ppt.	White ppt.	White ppt.	White ppt.

oak bark tannin. A further investigation of the chemical natures of the tannins through their decomposition products was then decided upon, so for this purpose the effects of several methods of decomposition were tried. These methods included fusion of the tannins with caustic alkali, boiling with hydrochloric acid, and the application of sufficient heat to alter their chemical constitutions; they were conducted as follows:

Fusion with Caustic Alkali.—Some of the tannin was added to potassium hydrate, which had been liquefied by heat. The mixture was thoroughly stirred and the heat continued for twenty minutes, after which time the fusing substances were allowed to become cold. The solid cold mass was dissolved in water, the resulting solution slightly acidified with dilute sulphuric acid, the unfiltered mixture shaken with ether and the solvent separated and allowed to evaporate spontaneously. Residues of a more or less reddish-brown color were obtained in all cases. These residues were dissolved in water and tested qualitatively, as indicated by the following chart:

	Potassium Cyanide.	Ferric Chloride and Sodium Carbonate.	Ferrous Sulphate.	Lead Acetate.	Pine Wood and Hydrochloric Acid.
Chimaphila	No change.	Red color, reddish yellow ppt.	Reddish color.	Yellowish ppt.	No change.
Trailing arbutus . .	No change.	Green ppt., red color.	Green color.	Yellowish ppt.	No change.
Gaultheria	Olive green color.	Green ppt., red color.	Green color.	Brownish ppt.	Red color.
Mountain laurel . .	Olive green color.	Green ppt., red color.	Green color.	Brownish-yellow ppt.	Red color.
Manzanita	No change.	No change, reddish-yellow color.	Slight green color.	Yellowish ppt.	No change.
Uva Ursi	Reddish color.	Green ppt., reddish color.	Plum color.	Brownish yellow ppt.	No change.
Protocatechuic acid	—	Bluish-green color, red color.	Violet color.	White ppt.	—
Gallic acid	Red color.	Deep blue ppt.	No reaction.	White ppt.	—

Action of Acids.—To effect the decomposition of the tannins by this means, a quantity of each sample was added to boiling hydrochloric acid which contained 2 per cent. of absolute gas. All of the samples dissolved in this liquid. As the boiling progressed, the liquids to which the tannins from chimaphila, manzanita, and uva

ursi had been added acquired yellow colors, while those in which the tannins of trailing arbutus, gaultheria, and mountain laurel had been dissolved, developed red colors. When the liquids had attained the boiling point those representing the tannins of chimaphila, manzanita and uva ursi commenced to deposit brownish precipitates, while red deposits separated from the solutions corresponding to the principles from trailing arbutus, gaultheria and mountain laurel. These solutions were boiled for two hours, and then allowed to cool. The insoluble substances which had separated were then filtered off. They were washed with cold water and then allowed to dry in the air. They were next treated with hot water, which showed a solvent action on all of them. The solutions obtained by the use of hot water gave the following reactions:

Reagent.	Chimaphila.	Trailing Arbutus.	Gaultheria.	Mountain Laurel.	Manzanita.	Uva Ursi.
Ferric chloride and Sodium carbonate	Reddish-yellow color. Brown ppt.	Olive-brown color. Deep brown ppt.	Plum color. Brown ppt.	Olive-brown ppt. Blackish-brown color.	Olive-brown ppt. Dark brown ppt.	Bluish color, green ppt. Brown ppt.
Potassium cyanide	Red color.	Deep red color.	Dark red color.	Greenish-yellow color.	Reddish yellow color.	Yellowish color.

Some of that part of the insoluble product from the action of the 2 per cent. hydrochloric acid, which was undissolved by the hot water, was thereafter treated with alcohol, which dissolved all of them completely. The alcoholic solutions so obtained gave these reactions with ferric chloride:

Chimaphila.	Trailing Arbutus.	Gaultheria.	Mountain Laurel.	Manzanita.	Uva Ursi.
Brownish-red color.	Green color and ppt.	Green color and ppt.	Plum color and ppt.	Green color and ppt.	All dissolved in hot water.

The remainders of the insoluble portions were treated with potassium hydrate solution, which also readily dissolved the substances with the production of colored solutions. All of these solutions, when made acid with acetic acid, deposited precipitates resembling in appearance the substances which had been dissolved. The acid

liquids, which were filtered from the insoluble substances deposited during the treatment with hot hydrochloric acid, were shaken with ether in order to remove any decomposition products which might be present. The several portions of ether, which were employed for this purpose, were mixed, the excess recovered by distillation, and the remainder allowed to evaporate spontaneously. Upon the evaporation of the ether, there was left, from each of the tannins, a residue which was soluble in water. The following table shows the reactions given by the water solutions of these residues:

Product from Tannin of	Potassium Cyanide.	Ferric Chloride and Sodium Carbonate.	Ferrous Sulphate.	Lead Acetate.	Pine Wood and Hydrochloric Acid.
Chimaphila	Red color, fading.	Green ppt., red color.	Chocolate brown ppt.	Yellowish ppt.	No change.
Trailing arbutus . .	Red color.	Dark green ppt., red color.	Greenish-brown ppt.	Yellowish ppt.	Red color.
Gaultheria	Red color.	Light green ppt., red color.	Blue ppt.	Yellowish ppt.	No change.
Mountain laurel . .	Red color.	Green ppt., red color.	Green color.	Yellowish ppt.	No change.
Manzanita	Red color.	Brown ppt., red-brown ppt.	Brown ppt.	Yellowish ppt.	Slight red color.
Uva Ursi	Red color, fading.	Green color and ppt., deep claret color.	Greenish color.	Yellowish ppt.	No change.
Protocatechuic acid	—	Bluish-green color, red color.	Violet color.	White ppt.	—
Gallic acid	Red color.	Deep blue ppt.	No reaction.	White ppt.	—

Action of Heat.—To obtain the decomposition products which result from the heating of the tannins to such an extent that their chemical compositions are altered, a portion of the principle from each of the plants was stirred into a few cubic centimetres of glycerin and the resulting mixture heated to 180° C., for about half an hour. The temperature was then raised to 190° C., at which point it was maintained for ten minutes. The mixtures were allowed to become cold, and were subsequently dissolved in water. The water solutions were shaken with successive portions of ether, which were separated and allowed to evaporate spontaneously. The residues which were thus obtained were dissolved in water and submitted to the reactions expressed in the following chart:

Product from Tannin of	Calcium Hydrate.	Ferric Chloride.	Ferric Acetate.	Ferrous Sulphate.
Chimaphila	Slight reddening.	Green ppt.	Slight green ppt.	Greenish ppt.
Trailing arbutus	Brownish ppt.	Green ppt.	Green ppt.	Plum ppt.
Gaultheria	Red ppt. and color.	Green ppt.	Green ppt.	Plum ppt.
Mountain laurel	Slight red color.	Plum ppt.	Plum ppt.	Greenish ppt.
Manzanita	Greenish-yellow ppt.	Olive-brown ppt.	Olive-brown ppt.	Plum ppt.
Uva Ursi	No change.	Olive-brown ppt.	Olive-brown ppt.	Plum ppt.
Pyrogallol	Purple color, changing to brown.	Red color, changing to brown.	—	Blue color, changing to green and red.
Catechol	Reddish or brown ppt.	Green color.	—	No reaction.

The foregoing chemical investigations not having given as definite knowledge of the exact nature of the tannins as the author desired, a quantity of the principle from each of the drugs was submitted to combustion in order to determine the ultimate composition of the substances as the last recourse in the attempt to classify them. The combustions were performed with copper oxide, in an open tube through which a stream of oxygen was conducted. The results were calculated into percentages, in the usual way; they were as follows:

	Trailing Arbutus.	Gaultheria.	Mountain Laurel.	Oak Bark.
Carbon	59·26	59·73	61·00	59·79
Hydrogen	4·88	4·87	5·33	5·08
Oxygen	35·86	35·40	33·67	35·13

	Uva Ursi.	Manzanita.	Gallotannic Acid.
Carbon	52·88	54·71	52·17
Hydrogen	4·26	4·44	3·10
Oxygen	42·86	40·85	44·73

	Chimaphila.		
	I.	II.	III.
Carbon	57·54	58·22	57·82
Hydrogen	5·69	5·58	5·45
Oxygen	36·77	36·20	36·73

The average percentage composition of the tannins from the barks of nine species of oak, as given on page 93 of Volume II of "The Tannins," by Henry Trimble, as also the percentage composi-

tion of gallotannic acid, are here added for comparison with the amounts of the three constituent elements indicated by the combustions of the tannins of the six Ericaceæ.

The insight into the compositions of the principles, which the ultimate analyses afforded, undoubtedly indicates that the tannins obtained from trailing arbutus, gaultheria and mountain laurel have the same centesimal composition as that class of these compounds of which oak bark tannin is the most common representative; and that the tannins from manzanita and uva ursi contain the same proportions of carbon, hydrogen and oxygen as does gallotannic acid.

It will be seen that the results obtained for the tannin of chimaphila do not closely agree with the percentage composition of either class. This tannin was particularly difficult to purify. Two different lots of the drug were extracted for its tannin with the same success, for, even after repeated purifications, the results of combustion were found to be constant, as is shown above. But these combustion figures certainly indicate greater resemblance to the oak bark tannins than to gallotannic acid, as also did the general chemical behaviors of the tannin in the processes of decomposition and the characters of the products so obtained.

In conclusion, it seems justifiable to believe that sufficient evidence has been presented to prove the existence of the two kinds of tannin in the uninjured or normal tissues of a single order, a fact which substantiates the idea that either kind of tannin may be physiological.

A CONTRIBUTION TO THE KNOWLEDGE OF SOME NORTH AMERICAN CONIFERÆ.

By Edson S. Bastin and Henry Trimble.

(*Continued from page 254.*)

PINUS RESINOSA, AITON.

RED PINE—NORWAY PINE.

GENERAL CHARACTERS.

This is a tree with a straight bole, attaining a diameter of about 2 feet at the base, and a height of from 75 to 150 feet. It has a rather regularly and distantly fissured bark, which is, between the fissures, smoother than in most of the other species, and of a red color, whence the common name, red pine. The cones are terminal,

conic-ovate, about 2 inches long and with but slightly thickened, pointless scales. The leaves are 5 or 6 inches long, in twos, from long sheaths, convex on one side and flat on the other, the former with from eight to twelve rows of stomata, and the latter with from seven to ten rows. Hypoderma often only one-layered or two-layered only in places; the single layer, or where doubled, the outer one, composed of cells which are only moderately thick-walled, while the cells of the inner layer are excessively thick-walled.

Secretion reservoirs numerous, from nine to twelve, located next the hypoderma, and each is bounded by a layer of thick-walled

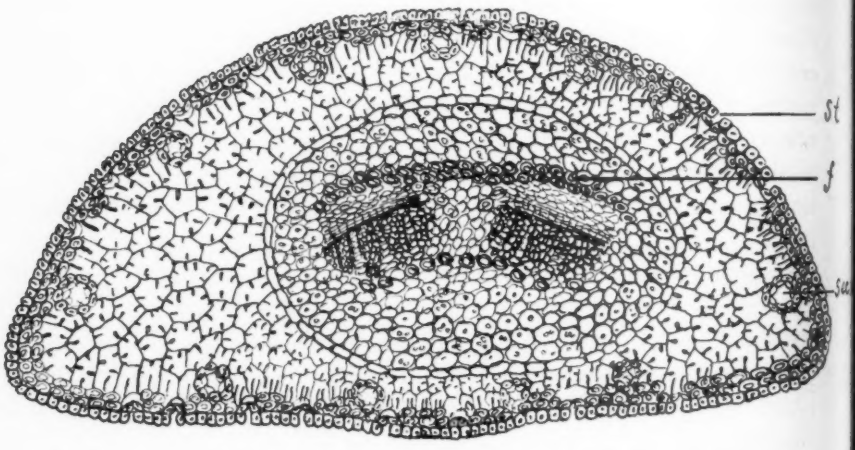

Fig. 28, cross-section of leaf of Pinus resinosa, magnified about 100 diameters. *St*, stoma; *f*, band of fibrous tissue forming the outer boundary of the bast; *sec. r.*, secretion reservoir.

cells. The fibro-vascular bundles are each crossed by three or four medullary rays. A band of thick-walled fibres in about two rows bounds the bast on its exterior and extends across the interval between the bundles. There are usually also a few thick-walled fibres forming an interrupted row opposite the xylem ends of the bundles.

MICROSCOPICAL STRUCTURE.

A cross-section of a branch of two years' growth showed the following structure: Externally, an epidermis, in places ruptured, composed of small, but excessively thick-walled cells; beneath this two or three layers of thin-walled parenchyma, interior to which was

a periderm, composed at its outside of stone cells, in one or two layers, and interiorly of thin-walled cells, including a cork cambium, all rich in tannic matters. Interior to the periderm layer was a considerable thickness of parenchyma, composed mostly of large, tangentially elongated cells, a large proportion of which contained

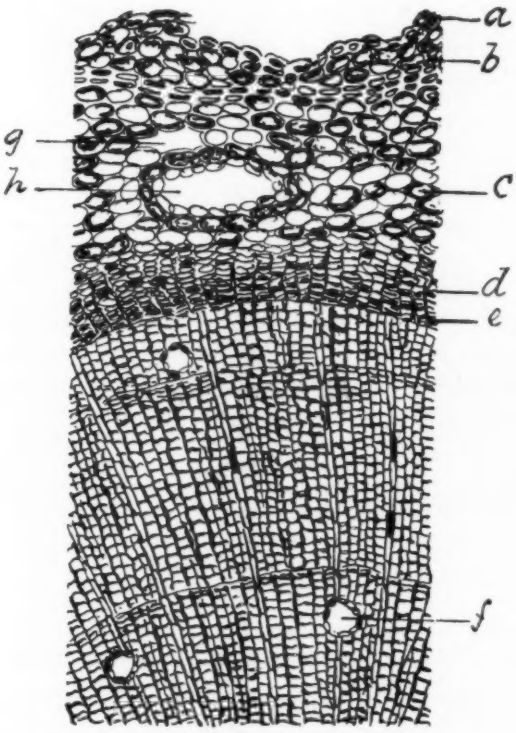

Fig. 29, cross-section of stem of Pinus resinosa, two years old, magnified 100 diameters. *A*, epidermis; *b*, thick-walled periderm cells; *c*, tannin cell; *d*, bast layer; *e*, cambium; *f*, secretion reservoir in xylem; *g*, lacuna; *h*, secretion reservoir in bark. Drawing from specimen that had been treated with anhydrous ferric chloride, dissolved in absolute alcohol, for the purpose of showing the distribution of tannin.

tannin. The secretion reservoirs found in this area were similar in character to those already described in other species.

In the xylem the secretion reservoirs were observed to be disposed more or less evidently in circles.

Tannic matters appeared to be distributed very much as in the

species already described, abounding in the middle and inner layers of the bark, in the pith, and occurring in many of the medullary ray cells of the xylem and in the secreting cells bounding the secretion reservoirs.

The secretion reservoirs appeared to be not less abundant than in some of the more resinous species, but the oleoresinous matters were more localized in the secretion reservoirs and the cells immediately surrounding them, and less diffused through other tissues than in P. palustris, for example.

OCCURRENCE.

This tree has a northerly range, occurring in Canada and in the northern United States from Maine to Minnesota. It has a compact, hard, not very resinous wood, which is durable and much prized for lumber.

CHEMICAL COMPOSITION.

The composition of Pinus resinosa has been investigated so far as to determine the percentages of tannin and mineral constituents in the leaves, stem bark and root bark, with the following results:

	Moisture.	Ash in absolutely dry substance.	Tannin in absolutely dry substance.
Leaves	7·71	2·28	2·60
Stem bark	9·73	2·65	12·67
Root bark	10·77	2·67	8·40

The ash of the leaves consisted of potassium, calcium, magnesium, combined with phosphoric, sulphuric and very little carbonic acid.

The ash of the stem bark consisted of potassium and calcium carbonates, phosphates and sulphates.

The ash of the root bark was found to be composed of potassium and calcium phosphates, sulphates and chlorides.

The samples were collected near Philadelphia, in November.

ECONOMICS.

No record appears to exist of the use of the bark of the red pine in tanning, although the percentage of tannin would indicate the possibility of such an application. Its resin is also abundant and

would make it valuable for that constituent in the absence of other resinous pines. The wood is quite hard and durable, and is used in nearly all kinds of construction.

PINUS GLABRA, WALTER.

SPRUCE PINE.

GENERAL CHARACTERS AND OCCURRENCE.

This is a small-sized tree, 40 to 60 feet high, branching from near the ground, having whitish and smooth branchlets, and usually solitary cones, which are about 2 inches long and have the scales nearly destitute of spines. The wood of the tree is soft and white.

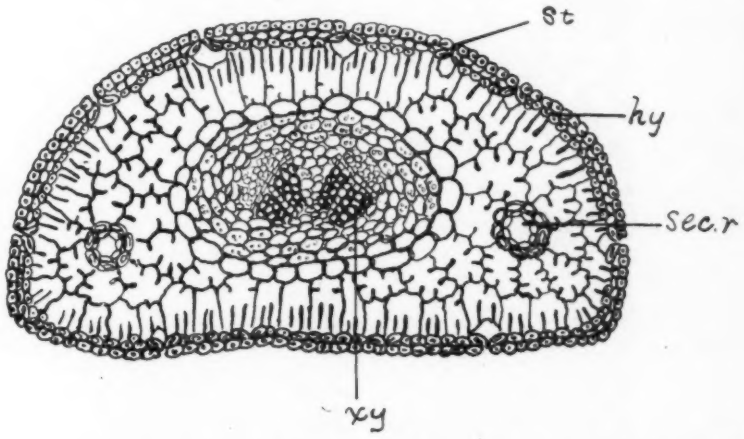

Fig. 30, cross-section of leaf of Pinus glabra, magnified 100 diameters. *St*, stoma; *hy*, hypoderma; *sec. r.*, secretion reservoir; *xy*, xylem of one of the two bundles.

The species occurs in South Carolina and Florida, and is there known as the spruce pine.

Its leaves are in twos, slender, scattered, 3 or 4 inches long, from a sheath about $\frac{1}{6}$ inch long. On the flat surface are about six rows of stomata, and on the convex about nine rows.

MICROSCOPICAL STRUCTURE.

The cross-section showed, underneath the thick-walled epidermis, a usually two-layered, but sometimes only one-layered, hypoderma, the outer of these with its cell walls but slightly thickened, the inner with its walls considerably thickened. The secretion reservoirs are usually two in number, one opposite each of the angles of

the leaf and about midway between the epidermal and the hypodermal cells. The circle of strengthening cells about the reservoir were observed to have their walls moderately thickened. The cells of the endodermis were large and had their walls somewhat thickened. Interior to the endodermis were no fibrous elements, except

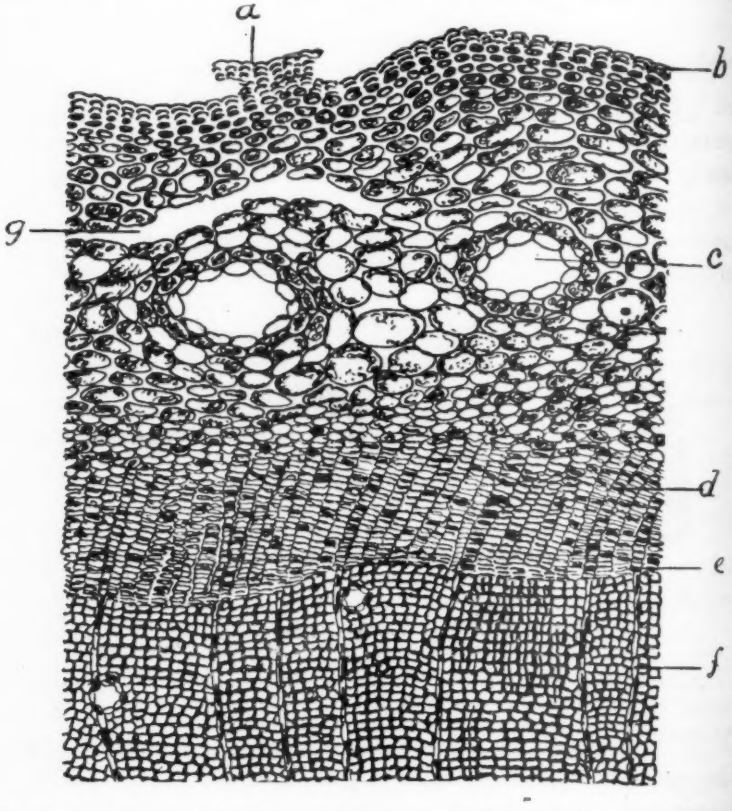

Fig. 31, cross-section of stem, two years old, of Pinus glabra, magnified 100 diameters. *A*, portion of remaining epidermis; *b*, thickish-walled periderm; *c*, secretion reservoir in cortex; *d*, bast layer; *e*, cambium; *f*, medullary ray in secondary xylem; *g*, lacuna. Drawing from specimen that had been treated with ferric chloride solution in absolute alcohol.

those contained in the small xylem bundles. The transfusion tissue, interior to the endodermis, and the folded mesophyll, exterior to it, presented no peculiar features.

A cross-section of a twig of three years' growth showed on the exterior fragments only of the epidermis, and of a few layers of

sublying parenchyma, the periderm appearing mostly at the surface. The outer layers of the periderm were thick-walled, the inner thin-walled and quite rich in tannic matters. The large-celled parenchyma next interior contained lacunæ and secretion reservoirs, and many of its cells were heavily charged with tannin. A few cells of this region were observed to contain crystals of calcium oxalate similar to those observed in Pinus Strobus. The bast layer was destitute of fibrous or other lignified elements, and had its tannin cells mostly arranged in radial rows. Most of the cells of this layer were small, but there were occasional larger ones containing tannin or oleoresin.

The xylem presented no important peculiarities, save that the walls of the tracheids showed less thickening than in most species of the genus.

CHEMICAL COMPOSITION.

We have been able to obtain a small quantity of the stem bark of this pine through the kindness of Dr. Charles Mohr. It was collected in February in the vicinity of Appalachicola, Fla.

In addition to the resin, the bark yielded the following data in regard to tannin and ash:

	Per Cent.
Moisture	7·44
Ash in absolutely dry substance	1·70
Tannin in absolutely dry substance	3·56

PINUS MONTANA, DU ROI.

GENERAL CHARACTERS.

This is the Dwarf, or Mugho pine of Southern Europe. It is frequently planted for ornament in American parks and gardens. It is a shrub, or small bushy tree, seldom attaining a height of more than 8 or 10 feet.

It bears rather small tapering cones, whose scales are tipped with slight prickles. Its leaves are 2 or 3 inches long, stiff, in twos, from a sheath about ⅓ inch long, flat on one side and convex on the other; stomata in about 6 or 8 rows on the flat surface, and in from 9 to 12 on the convex. The epidermis is large-celled, with the cell walls excessively thickened; the hypoderma is one-layered, and the walls of its cells are but slightly thickened; the secretion reservoirs are five or six in number, in contact with the hypoderma, and its circle of strengthening cells are thick-walled. The endodermal cells have their walls somewhat thickened. The vascular

bundles are rather small, and each has two or three medullary rays. Within the area enclosed by the epidermis there are either no

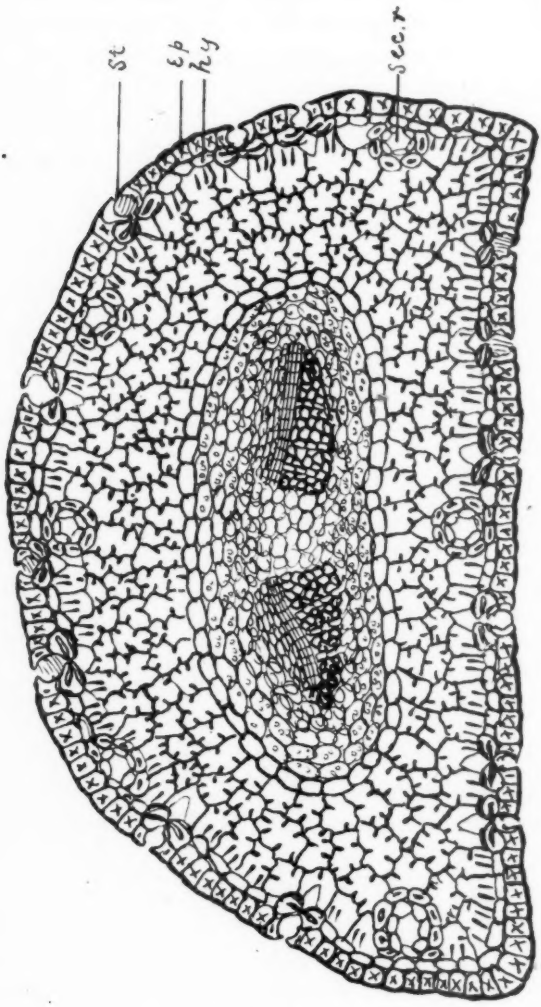

Fig. 32, cross-section of leaf of Pinus Montana, magnified 100 diameters. *St*, stoma; *ep*, epidermal cell; *hy*, thin-walled hypodermal cell; *sec. r.*, secretion reservoir.

lignified fibres, or only a very few, except those which belong to the xylem of the bundles. The mesophyll and transfusion tissues present no peculiarities.

MICROSCOPICAL STRUCTURE.

The cross-section of a twig of two years' growth showed in places the persistent epidermis, but there were frequent interruptions due to exfoliation caused by the growth of the periderm. When present it was excessively thick-walled, lignified and cutinized.

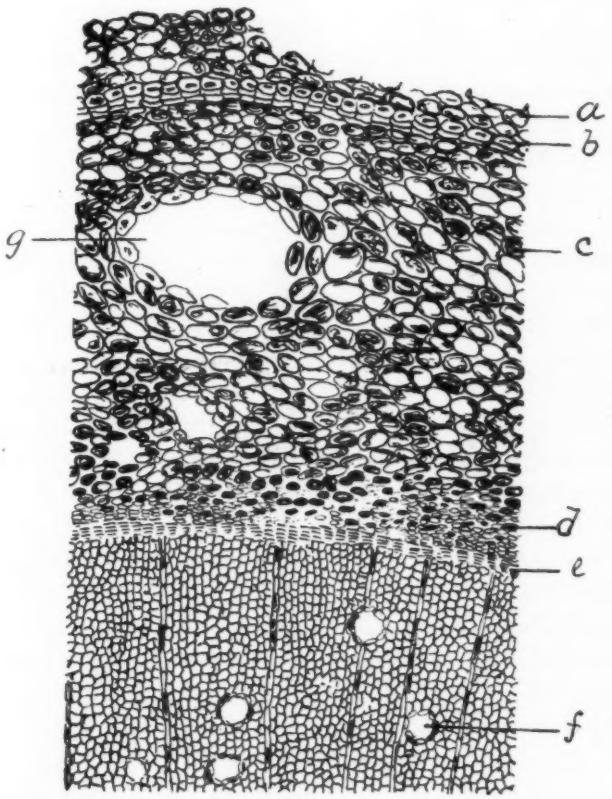

Fig. 33, cross-section of stem, of three years' growth, of Pinus Montana, magnified 100 diameters. *A*, disintegrating cells at the exterior; *b*, sclerotic cells of the periderm; *c*, tannin cells; *d*, tannin cell in bast layer; *e*, cambium; *f*, secretion reservoir in secondary xylem. Drawing made from specimen treated with solution of anhydrous ferric chloride in absolute alcohol.

Intervening between it and the periderm were a few layers of thin-walled parenchyma. The outer layers of the periderm were sclerotic, and the newer ones beneath thin-walled and rich in tannic matters. The cortical parenchyma, the bast layer, the cambium

and the xylem were similar in structure and in the distribution of the tannin and oleoresin to the corresponding parts of other members of the Pinaster group already described.

PINUS VIRGINIANA, MILLER.

PINUS INOPS, AITON.

GENERAL CHARACTERS.

This species is commonly known as the Scrub Pine or Jersey Pine. It is a low, straggling tree, from 15 to 40 feet high, the trunk seldom more than a foot in diameter, rough and dark-colored, top rounded or flattish, branches tortuous, spreading, young shoots purplish and glaucous, and branchlets frequently drooping. The cones are drooping, oblong-conical, sometimes curved, 2 or 3 inches long, persistent for several years, the thickened scales tipped with a straight or recurved awl-shaped prickle. Its leaves are rather stout and rigid, in twos, from short sheaths, 1½ to 2¾ inches long, usually somewhat twisted, with about ten rows of stomata on the flat side, and about twelve on the convex side; epidermis of small thick-walled cells, hypoderma about three-layered and also rather small-celled, the outer layer composed of thin-walled cells, the other two of thick-walled cells; the secretion reservoirs located in the mesophyll about midway between the hypoderma and the endodermis, and one opposite each angle of the leaf, sometimes also one opposite the middle of each face; the endodermis large-celled, with the walls of its cells but slightly thickened; the two diverging vascular bundles about five-rayed. There are few or no lignified cells interior to the endodermis, except those which belong to the xylem of the bundles.

MICROSCOPICAL STRUCTURE.

A cross-section of a stem of two years' growth showed the following structure: At the exterior an epidermis composed of rather small, thick-walled, lignified and cutinized cells was still present in places; underlying this were two or three layers of thin-walled parenchyma cells; this was succeeded by one or two layers of stone-cells, probably representing the outer layers of the periderm; the rather thick, cortical parenchyma was destitute of lignified elements, and contained very numerous tannin cells irregularly distributed among ordinary parenchyma cells, which contained little or none; in this region were also scattered secretion reservoirs of large size, similar

to those occurring in species already described. The bast layer was destitute of lignified elements, and contained numerous tannin cells commonly arranged in more or less distinct radial rows.

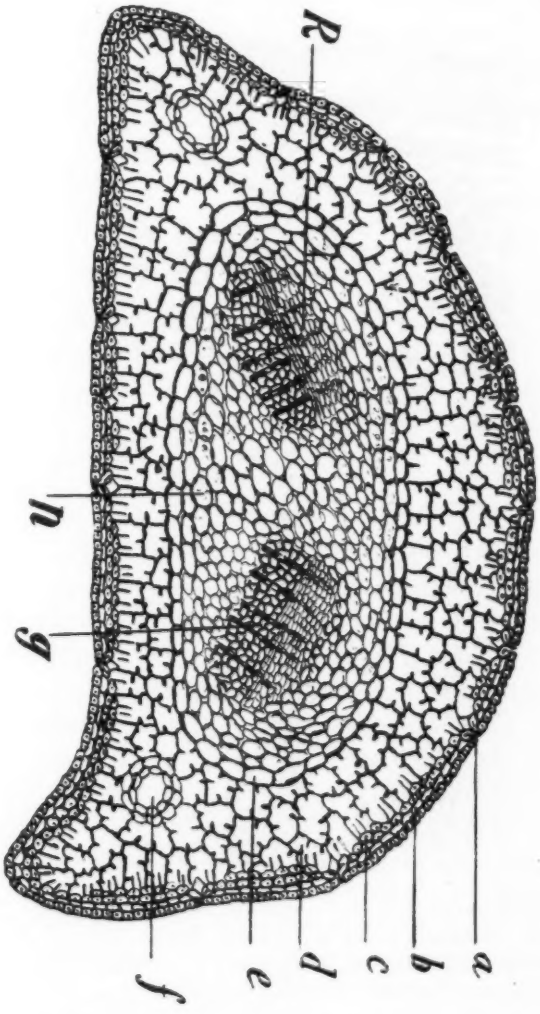

Fig. 34, cross-section of leaf of Pinus Virginiana, magnified 80 diameters. *a*, stoma; *b*, first layer of hypoderma, composed of rather thin-walled cells; *c*, second layer of hypoderma, composed of thick-walled cells; *d*, mesophyll cell; *e*, cell of endodermis; *f*, secretion reservoir; *g*, xylem of one of the bundles; *h*, transfusion tissue; *R*, phloem of one of the bundles.

The xylem showed no marked peculiarities, the tannin present being mostly confined to the medullary ray cells and the cells bordering the secretion reservoirs.

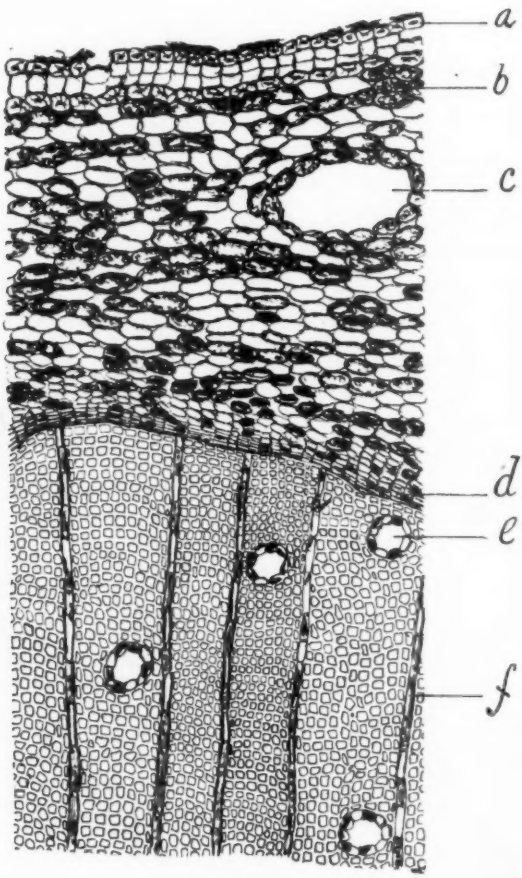

Fig. 35, cross-section of stem, two years old, of Pinus Virginiana, magnified 85 diameters. *A*, epidermis, composed of thick-walled cells; *b*, tannin cells of the cortex; *c*, secretion reservoir in the cortex; *d*, cambium zone; *e*, secretion reservoir in the xylem; *f*, medullary ray in xylem.

The species contains considerable oleoresin, which occurs not only in the secretion reservoirs and the secreting cells which bound them, but also in many of the tracheids of the xylem and in many of the ordinary parenchyma and tannin-bearing cells of the bark.

OCCURRENCE.

The tree grows in poor soil from Long Island to South Carolina, and westward to Kentucky. It abounds in southern New Jersey, eastern Virginia and in some parts of Pennsylvania.

CHEMICAL COMPOSITION.

A sample of the stem bark collected in southern New Jersey in November gave the following results for tannin and ash:

	Per Cent.
Moisture	12·92
Ash in absolutely dry bark	2·01
Tannin in absolutely dry bark	4·82

ECONOMICS.

Owing to its small size and the thickness of its sap-wood it is but little used for lumber, and, although it is rather rich in resin, it is not much employed as a source of this product.

The percentage of tannin would scarcely warrant the use of the bark in the manufacture of leather, except during a time of scarcity of other materials. The principal use of the wood is for fuel.

PINUS SYLVESTRIS, LINNE.

GENERAL CHARACTERS AND OCCURRENCE.

The Scotch fir or Scotch pine, as it is commonly called, is a native of Britain, northern Europe, the Alps, Pyrenees, Carpathian and Caucasus Mountain regions and northern Asia. It is also much cultivated as an ornamental tree in this country. It not only has a wide geographical range, but is capable of living under a great variety of conditions of soil and temperature. Under favorable conditions it attains a height of 80 to 100 feet and a diameter of from 2 to 4 feet. It has a straight trunk, covered with a deeply-fissured, reddish-gray bark, numerous, spreading, tortuous branches, and a rather dense, rounded or flattish top. Cones usually solitary, on short stalks, ovoid-conical before opening, about 2 inches long; scales woody, thickened at the ends, the apophysis rhomboidal, with a central tubercle. The leaves are usually in twos, from a scarious sheath about ¼ of an inch long, glaucous, rigid, bluish-green in color, from 1½ to 3 inches long, flat or channeled on the upper surface and convex on the lower, from eleven to thirteen rows of stomata on the flat or channeled surface, and from twelve to fifteen rows on the convex surface.

MICROSCOPICAL STRUCTURE.

A cross-section of the leaf showed a thick-walled rather small-celled epidermis, supported by a usually one-layered hypoderma composed of cells with moderately thickened walls. The secretion

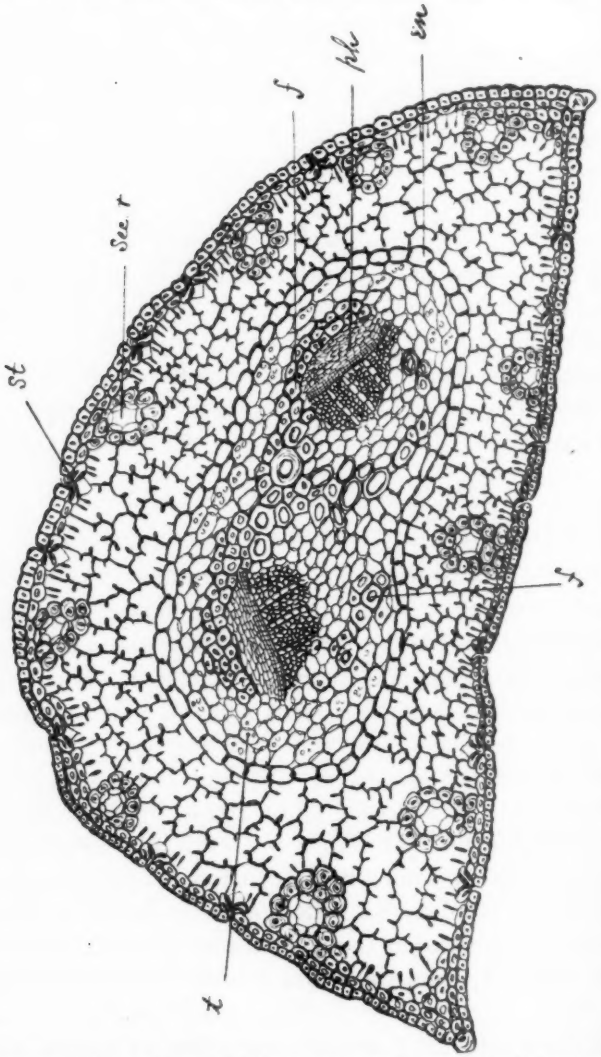

Fig. 36, cross-section of leaf of Pinus sylvestris, magnified about 90 diameters. *St*, stoma; *sec. r.*, secretion reservoir; *f*, fibres, very thick-walled, adjacent to the bast; *ph*, phloem of a bundle; *en*, endodermis; *f'*, fibres; *t*, transfusion tissue, consisting of short, pitted tracheids.

reservoirs were numerous, usually about ten, in contact with the hypoderma, and each had a circle of very thick-walled supporting cells. The endodermis was rather large-celled and the radial walls were thickened and cutinized. The two diverging vascular bundles were each about three-rayed. At the outer margin of the phloem were numerous thick-walled fibres; they also occurred between

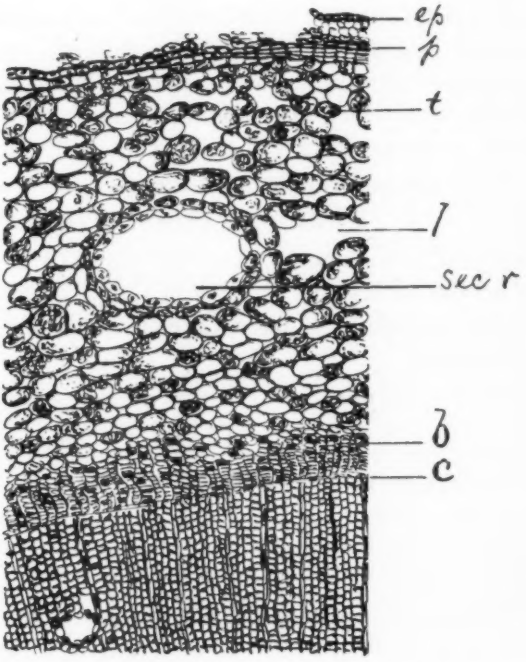

Fig. 37, portion of cross-section of stem, two years old, of Pinus sylvestris, magnified 100 diameters. *Ep*, epidermis; *p*, periderm layer; *t*, tannin cell in cortex; *l*, intercellular air space, or lacuna; *sec. r.*, secretion reservoir; *b*, bast layer of bark; *c*, cambium zone. Drawing made from a specimen that had been treated with a solution of ferric chloride in absolute alcohol, to show distribution of tannin.

the bundles and scattered in the transfusion tissue between the xylem of the bundles and the endodermis.

A cross section of the stem two years old showed the following structure: Fragmentary remains of the small-celled or thick-walled epidermis at the exterior; beneath it two or three layers of thin-walled cells; beneath this the periderm layer, the outer cells of

which were sclerotic; interior to this a rather thick cortical parenchyma, composed wholly of thin-walled cells, many of which are rich in tannin and resin, and in which occur secretion reservoirs of the usual character, and also some irregular lacunæ containing air; a bast layer composed of smaller cells, many of them containing tannin, all thin-walled, and arranged more or less distinctly in radial rows; a cambium zone, also containing tannin, and a xylem cylinder consisting of tracheids similar to those of the other pines; medullary rays which contained considerable tannin, and scattered secretion reservoirs, containing oleoresin and surrounded by cells which also contained tannic matters. Many of the tracheids and medullary ray cells contained oleoresin, as did also many of the parenchyma cells of the bark.

CHEMICAL COMPOSITION.

The leaves, stem bark and root bark from a tree of Pinus sylvestris grown in the vicinity of Philadelphia, and collected in November, have been examined for percentage of tannin and ash, with the following results:

	Moisture.	Ash in absolutely dry substance.	Tannin in absolutely dry substance.
Leaves	7·50	3·46	6·84
Stem bark	10·07	2·63	16·91
Root bark	10·04	2·66	13·17

The ash of the leaves contained potassium, iron and calcium carbonates, phosphates and sulphates.

The ash of the stem bark was similar to that of the leaves, with the exception of the iron. The ash of the root bark contained the same compounds that were found in the leaves.

The tannin and other constituents of an acid character, contained in this pine, have been studied by a number of European investigators, notably Kawalier (*Sitzber. der K. Akad. zu Wien*, 11, 344, 1853), and an appendix to this shortly after by Rochleder and Schwarz.

ECONOMICS.

This is a valuable timber tree, much used for lumber and shipbuilding in the countries in which it grows. Its heart wood is red-

dish, hard, resinous and very durable. It is also the source of a very considerable proportion of the tar and turpentine used in Europe.

A food is prepared in Norway from the innner bark, and from the leaves are manufactured a substance called fir-wool or pine-wool, which is employed for filling mattresses, as a surgical dressing, and even to some extent for the manufacture of woven fabrics.

(*To be continued.*)

FACTS IN THE HISTORY OF DOVER'S POWDER.

By William B. Thompson.

It would, indeed, seem to be very appropriate, as the century closes, to adopt into the archives of this College, some, at least, of the interesting treasures of history; not only those which may belong to that era of time through which this honored Institution has passed, and to those local events which have naturally become identified with it, but to that broader scope which has marked the progress of pharmacy throughout the world, and the epochs of its advancement as a science.

We are apt to forget that memory has a limit, and recollection becomes extinct, but that which is recorded on the page of history is, by transmission, imperishable. Therefore, while we may yet gather the instruction, let us not lose sight of the value it may yield to the votary and student of the future. The origin, lives, and personal history of eminent pharmacists are so replete with interest, so suggestive of patient labors, so full of the fruition of valuable and important discovery, as to become an inspiriting stimulus to effort, fostering at the same time that higher motive—the humane instinct of our nature. It has been almost wholly through the avenues of pharmacy that research and invention have given to the world those agencies of cure which have promoted and preserved human life. At the earliest dawn of civilization, pharmacy, with her crudities and simples, led the van of a crusade against disease and death. Medicine followed at her beckoning, and chemistry, born of alchemy, lent her aid to the work of disclosing the mysterious compositions of organic and inorganic matter. Thus pharmacy, the foster mother, found willing handmaids in the allied sciences. All then that pertains to this history, all that is interwoven with it, even fact, fiction

and romance, become the subjects of interest, and appeal for preservation at our hands. Our kindred institutions have awakened to the importance of incorporating in the literature of college historical clubs the traditions of the professions, and with these the instructive truths which a faithful narrative may hand down to posterity as a kind of legacy.

The topic which we have chosen for a brief consideration with you to-day has been suggested in the publication, by the Johns Hopkins Hospital Historical Club, on the life and personal history of Thomas Dover, physician and buccaneer, author and originator of Dover's Powder. Strange, indeed, it is that the inventor's fame should survive the lapse of two and a half centuries, and be perpetuated upon the seemingly unsubstantial support of a medical powder! Yet what tyro of the drug store of to-day does not associate with his alphabet of familiar preparations the well-known Dover's Powder; and is there anything more familiar to any of us? Yet, if the biographer had not coupled the career of Dr. Thomas Dover with a tinge of romance, attaching the story of a privateer's life and exploits at sea, quite likely, perhaps, Dr. Thomas Dover, as a name, would never have become known to fame and to us. This points to the moral of our plea for the safe custody of facts worthy of preservation at the hands of a college historical society.

We will not stop to discuss the merit of Dover's Powder more than to say its sterling value has never been superseded, and its therapeutic importance in specific use remains to this day unquestioned. We would fain worship at the shrines of many new gods, but the good old deities are yet worthy of our highest homage.

Thomas Dover was born in England in the year 1660. He settled and practised medicine for a time in Bristol; left there for a period and returned again. He lived with, and was contemporaneous with, Sydenham. He gained much professional reputation on the occasion of a severe epidemic of fever. This may have suggested to him the use of ipecac and opium in a compound. He seems to have scoffed a good deal at his brother doctors, and finally wrote and published a work, entitled "An Ancient Physician's Legacy."

In Dover's day and time, the apothecaries were in the ascendency, being the medical practitioners, whilst the doctors were called in to attend in childbirth and protracted illness. Indeed, it is stated that

then the apothecary surgeons rode in their chaises, while the doctors *walked*, and that the former were generally first consulted when the choice of a family physician was to be made. Mercury had at this time an unrestrained use—perhaps *abuse* would be a better word—and much severe public stricture was made upon the fact. Crude quicksilver was administered, and Dover was a warm advocate of its use—in fact, he was called the *quicksilver doctor*. One Captain Henry Coit, a patient of Dover, took an ounce and a quarter of crude mercury daily, until he had used more than two pounds weight! Dover professed to believe that mercury freed the patient from all vermicular diseases, opened all obstructions, and made a pure balsam of the blood. It is quite possible its ponderosity and gravity carried it unchanged entirely through the intestinal processes, and it may have had the merit of utility—that is, it could be used on another patient after its exit from the previous one. The doctors and apothecaries were at loggerheads. Dover said the best way to affront the latter was to order too little physic—each patient being deemed to be worth a certain sum to the dispenser. The apothecaries discriminated in their preferences among physicians—more natural, perhaps, than politic—generally favoring those who would write the longest and most numerous prescriptions; so that, between drugging and expense, the lot of the invalid has at no time been enviable. Nor need we attempt to conceal the fact that the relations between prescriber and dispenser have never been long harmonious, each by turn exercising a lion-like aggressiveness, and neither evincing a lamb-like submissiveness. But we must come to the romance of our narrative. In 1708, Dover joined the company of a group of Bristol merchants in a scheme to fit out two vessels for privateering, or piracy, in the South Seas. Dover, it seems, went as captain, and the voyage was eminently successful in booty. They took, in various reprisals from the marauding, thieving Spaniards—the then buccaneers of the high seas—the hoards of treasure and gold which they in turn had filched from the native Indians—the principle of *might* applied to *right*. The expedition returned to Britain, enriched with spoil, the treasure amounting to £170,000 sterling. It was during this memorable voyage that Dover, landing with some of his crew on the island of Juan Fernandez, discovered the existence of Alexander Selkirk—Robinson Crusoe—in his dreary solitude on this desert shore. Our biographer then relates

many interesting incidents, which are the *facts* of the life and history of this hero of a wonderfully vivid romance. But the story is so familiarly inwrought in the literature of our nursery and boyhood days that it needs no repetition to you here. Our purpose has been served in giving you incidents in the life of Dr. Thomas Dover, and in the events which led him to create a medicinal powder, than which no composition could be more simple; yet it has stood the test of time quite beyond anything which appears in the annals of pharmacy and medicine, so that the days of patient searching and of little things may not yet be passed.

"Dover's Powder may be viewed as one of the few surviving relics of mediæval polypharmacy, which have maintained their existence even in this age of progression and scientific medication. The formula presents a forcible illustration of that happy combination where the properties and character of one substance effectively aid the other. Whilst opium constricts and checks the secretion of the digestive ferments, the tissue metabolism, and also the excretion of toxines by the liver and kidneys, ipecacuanha antagonizes every one of these actions; opium restrains the nauseant effect of ipecac; both together, in union, determine to the skin, and to the bronchial mucous membrane, relaxing the vaso-motors and allaying the inflammatory diathesis!"

In conclusion, it might be well to note the fact that the method of preparing Dover's Powder originally differed very essentially from the present process, both in practice and in principle. This part of the subject might form an essay from some of our younger brethren. The doses of that day corresponded exactly with the treatment—they were appallingly heroic to our senses. Blood to depletion, blisters to excoriation, and 70 grains of Dover's Powder, in a glass of white wine possett on going to bed, was considered specific enough for an acute impending gout!

Large deposits of platinum-bearing ores are said to have been discovered at Fitfield, New South Wales. It has been known for several years that platiniferous lead existed in that locality, and the deposits have been worked, though only on a small scale. It is now found, however, that the platiniferous lead deposit is over a mile long, varying in width from 60 to 150 feet, and covered with 60 to 70 feet of loam. The precious metals are practically confined to the bed rock and the drift for 3 inches above the bottom. Nuggets which weighed from a few grains up to 5 pennyweights have been occasionally found. The crude metal contains about 75 per cent. of platinum, and realizes at the present time upon the field about $6 per ounce.

EDITORIAL.

LAWS REGULATING THE CHARACTER OF FOODS AND DRUGS.

The paper on another page of this issue, by Prof. J. U. Lloyd, concerning "The Pharmacopœial Standard," furnishes much food for thought. The author does not in any way exaggerate the difficulties which beset the pharmacist, and his remarks to the Pharmacopœia Committee are suggestive rather than critical.

Legislators in endeavoring to arrive at some standard for medicinal preparations naturally turn to the Pharmacopœia, which is largely of the pharmacist's own making. It is to the credit of the latter that while he created a standard which he is endeavoring to live up to himself, he made its requirements too severe for it to be arbitrarily interpreted by every political appointee.

The Pharmacopœia defines the purity of some substances to the minute fraction of 1 per cent., while the physician may administer those same substances in quantities measured by that arbitrary standard, the teaspoonful, and thereby give 50 per cent. more or less than he intends.

Professor Lloyd calls attention to "the curious fact that the very thoroughness and precision of the Pharmacopœia may furnish a source of hardship to those whom it was intended to aid, on account of its being looked upon as the legal code by persons who are appointed to enforce laws regulating the purity of drugs."

One of the ways out of this difficulty is to change the Pharmacopœia; but there are very few pharmacists who would like to see this excellent standard lowered or changed, except for more exact and expeditious methods. Another remedy is to not have the Pharmacopœia the standard under which the laws are enforced. It has been found possible to apply laws to the sale of foods and other unofficial substances without the aid of such an exacting standard.

A third remedy is to have no laws governing the character of drugs, and this is by no means the worst suggestion, for it is the condition under which the great majority of people in this country are living at the present time. In many States, where such laws exist, they are not enforced, and yet it is possible anywhere in the United States for a person to buy pure drugs.

Laws regulating the practice of pharmacy have generally been satisfactory because it has usually been found necessary to give the administration of these laws into the hands of practical pharmacists; but when it comes to appointing inspectors to govern the character of foods and drugs, it usually happens that some one is put into the position because he is good for nothing else, and, of course, he makes a failure of his new venture. Pharmacists will make no mistake if they oppose the enactment of every law which has anything about the quality of drugs in it, until they can at least have the legislative committee of their State association investigate it.

FORMULAS FOR BITTER WINE OF IRON.

We recently noticed in a Belgian exchange (the *Annales de Pharmacie*) a short communication on bitter wine of iron, which is rather severe on those who have been proposing superior formulas for that preparation during the past twenty-three years. At the same time, it might be read with advantage by

those who are constantly suggesting new formulas for various other preparations without any real excuse except the desire for a change. The article in question is by H. J. Bultot, pharmacist, of Liège, Belgium. He calls attention to the fact that bitter wine of iron is daily prescribed in that city, and he offers the formula which, as he states, was published by Dr. Charles L. Mitchell in the AMERICAN JOURNAL OF PHARMACY, November, 1873. This formula, he says, gives entire satisfaction, and he has always dispensed the preparation made according to it, notwithstanding the fact that there are a great number of other formulas, which he delicately designates as "fantasistes et economiques."

The pharmacopœia committee have removed the necessity for any new formulas for this remedy in the United States; still, it is a question whether, in authorizing the present one, they did not make considerable sacrifices of elegance in order to obtain simplicity, and, as a result, many pharmacists in this country are still using the formula of Dr. Mitchell, or else each employs some favorite one of his own.

THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.

The pharmacists of this and some adjoining States are interested in the meeting of the Association to be held at the Holly Inn, Mt. Holly Springs, Cumberland Co., Pa., June 16, 17 and 18, 1896.

The first session will be held on the afternoon of Tuesday, the 16th, at 4 o'clock, in the parlor of the hotel, and the exercises will close on Thursday evening, the 18th. Friday will be devoted to an excursion to Gettysburg.

Mt. Holly Springs may be reached by any railroad which runs into Harrisburg. Trains leave Harrisburg for Mt. Holly daily at 8 A.M., 12 M. and 4 P.M.

Rooms may be secured in advance by writing to Mr. Harry R. Landis, proprietor of the Holly Inn. Rates, $2 per day.

A large room will be devoted to the exhibition of pharmaceutical preparations. John F. Patton, York, Pa., is local Secretary.

RECENT EXAMINATIONS BY THE PENNSYLVANIA STATE PHARMACEUTICAL EXAMINING BOARD.

At the recent meetings of the Pennsylvania State Pharmaceutical Examining Board, in Pittsburg and Harrisburg, 356 applicants appeared for examination, 110 at Pittsburg and 246 at Harrisburg. Of this number 86 succeeded in passing the examination for a registered pharmacist's certificate, and 97 for that of a qualified assistant's certificate. This is the largest class of candidates ever examined by the State Examining Board, and also the largest percentage of successful candidates, which is entirely due to the fact that nearly all the applicants now coming before the Board for examination are either matriculates or graduates of a college of pharmacy. The next meetings of the Board will be held at Bradford, on Tuesday, July 7th, and Williamsport, on Thursday, July 9th. The secretary of the Board is Dr. Charles T. George, of Harrisburg, Pa.

AMERICAN PHARMACEUTICAL ASSOCIATION.

Section on Scientific Papers.

Samuel P. Sadtler, Ph.D., Chairman, Philadelphia, Pa.; William C. Alpers, Secretary, Bayonne, N. J.; Lucius E. Sayre, Associate, Lawrence, Kan.

QUERIES.

(1) *Sanguinaria.*—The liquid preparations slowly deposit a precipitate upon the sides of the containers. Can a menstruum be devised which will hold permanently in solution the soluble constituents?

(2) *Gelatine Capsules.*—What general rule should be adopted in compounding prescriptions ordering gelatine capsules? When should the ingredients be dispensed in dry powder, and when is it preferable to form them into a mass?

(3) *Ichthyol.*—Ichthyol is now being used internally, dissolved in water and other media. A palatable form of administration is wanted.

(4) *Salol and Acetanilid* are given usually in powder form. Cannot formulas for therapeutically unobjectionable liquid preparations of the same be devised?

(5) *Salicylic Acid.*—It has been alleged that the synthetical salicylic acid now in the market occasionally shows the presence of salol. Is this statement correct, and if so, to what extent?

(6) *Formalin.*—A 40 per cent. solution of formaldehyde under that name is attracting much attention as an antiseptic and deodorizer. A good practical formula for its preparation by the retail pharmacist is wanted.

(7) *Kamala.*—It is supposed that resin is the active constituent. Investigation recommended. Is a tincture advisable?

(8) *Pyrethrum Carneum, Pyrethrum Roseum, Pyrethrum Cinerariæfolium.*—Insect powder. Can it not be used as a medicine? On what depend their insecticide properties?

(9) *Veronica Officinalis* is used largely as a house remedy for pectoral complaints and skin diseases. Is there any alkaloid or other active principle in the plant to warrant such use?

(10) *Viscum Album* (*Mistletoe*) is used by practitioners to arrest postpartum and other uterine hemorrhages. Investigation invited.

(11) *Pichurim Beans.*—What are they? Various descriptions of their oils are given by different investigators.

(12) *Strophanthus Seeds.*—A determination of the active principles in the seeds of commerce, their nature, quantity and method of valuation.

(13) *Pareira.*—Pareira is a valuable diuretic and tonic drug. Buxine has been found in it, but this can hardly be the important principle. What is it?

(14) *Rhus.*—What is the really potent principle of the Rhus group? Is it a volatile acid, as claimed by Maisch, or is it a substance resembling cardol?

(15) *Tannin.*—At what season of the year should the tannin drugs be gathered? What relation does the amount of tannin present bear to that of starch? Does the tannin increase as the starch decreases? Or, is this true of some drugs but not of others?

(16) *Cypripedium.*—There appears to be a poisonous principle, producing effects similar to those of *Rhus toxicodendron*, in the glandular hairs of some cypripediums, particularly *C. spectabile*. What is this principle?

(17) *Iris.*—The rhizomes of many species of iris abound in starch, as the species that furnish the orris root of commerce, but the rhizomes of *Iris versicolor* and of the *Iris pseudo-acorus* do not turn blue with iodine solution. What is the carbohydrate present?

(18) *Veratrum.*—By what means may the rhizomes of *Veratrum album* best be distinguished from those of *Veratrum viride?* Some method is desirable by means of which this may be done easily and with certainty.

(19) *Aconites.*—The different aconites are very liable to be confounded. In the case of drugs so potent it is exceedingly important that the structure of each species liable to be gathered or sold for the official should be carefully described. Some one should undertake the task of the thorough investigation of the microscopical structure of all the species.

(20) *Pepsin Test.*—A discussion of the variable results obtained in the tests.

(21) *Cotton-Seed Oil.*—A review of the tests for its presence as an adulterant in other fixed oils.

(22) *Cod Liver Oil.*—Are the official tests sufficient to distinguish a pure cod liver oil? If not, what additional ones should be adopted?

(23) *Methyl Acetate.*—Write a paper on the possible use of methyl acetate as a solvent in pharmacy.

(24) *Sodium Bisulphite.*—The sodium bisulphite of commerce is rarely found more than one-fourth the strength required by the U. S. Pharmacopœia. Is the official standard too high, or does this saltrapidly deteriorate on keeping?

(25) *Terpeneless Volatile Oils* are now articles of commerce. Are they liable to deteriorate on keeping? How much stronger are they than ordinary volatile oils?

(26) *Lard Oil.*—Lard oil appears to be grossly adulterated. Is it possible to obtain lard oil in the open market of the standard of purity of the U. S. Pharmacopœia?

(27) *Guaiacol.*—Commercial guaiacol varies in purity from 50 to 90 per cent., according to Dr. Squibb. Cannot some process be devised for its assay and purification, if necessary?

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the forty-third annual meeting, held at Denver, Colorado, August, 1895.

The only important part of this book, which we have not already reviewed, is the Annual Report on the Progress of Pharmacy, by Henry Kraemer. These 647 pages contain much valuable matter; in fact, it is the best digest of pharmacy for one year that has ever been published in this country. It will always be valuable for reference, especially to assist investigators in finding original papers when it is necessary to go back of the abstracts given. This report covers the period from June 30, 1894, to July 1, 1895, and to have been of the greatest benefit to the members it should have reached them not later than October of last year. It was not, however, published until about the first of May, 1896, so that some of the material contained in it lacks two months of being two years old.

We are not seeking to criticize any particular individual for this delay in

publishing the Proceedings, for it is probable that no individual is at fault. There is probably a reason for the delay, and the fault lies with the Association in not creating means whereby members may have the Proceedings promptly. The papers read at the meetings of the Association are usually published at once in various pharmaceutical journals, but the Report on the Progress of Pharmacy does not thus become public; it is too long to read at the meetings or to publish by private enterprise, so it is allowed to become partly useless by delay. It strikes us that this Report might be issued immediately after the meeting, in paper cover, although before considering that question it would be just as well to determine whether or not it is possible to issue the complete Proceedings within two months after the adjournment of the meeting.

RECHERCHES SUR LA CINCHONICINE. Thesis presented to the *École Supérieure de Pharmacie de Paris*, to obtain the diploma of "Pharmacien de premier classe," by M. Ferdinand Roques. Presented and sustained the 23d of April, 1896.

The author has shown that cinchonicine, instead of being amorphous and resinous, as heretofore supposed, is crystallizable, although he had previously stated this fact (*Compt. rend.*, 120, 1170). He also describes the preparation of numerous new derivatives of cinchonicine and some new salts.

A COURSE OF HOME STUDY FOR PHARMACISTS. First Lessons in the Study of Pharmacy. By Oscar Oldberg, Ph.D. Second edition. Chicago: The W. T. Keener Company, 1896.

We learn from the preface that the "Home Study for Young Pharmacists" is designed to be read without aid or guidance from any teacher. It will be in order, therefore, to examine how far the author has accomplished his purpose.

The introduction, of twelve pages, is quite readable, and could in part be comprehended by the young beginner, especially in that portion where he is told that the "Home study in pharmacy is of tried value as a course of preparatory reading. At the school of pharmacy, the difference between the student who has carefully read that book and the student who has not pursued any such preliminary reading is very marked."

We presume by school of pharmacy that the author means the one in which he is Dean. He, therefore, evidently takes the trouble to inform himself as to whether the students have read his book or not, for we can hardly believe that the difference between those who have read it and those who have not is so apparent that he can distinguish them without inquiry.

Nearly four pages of the introduction are occupied with the question whether a student shall take his store experience before or after he attends a college of pharmacy. These four pages possess, in a high degree, a resemblance to a number of papers which the author has from time to time presented to the American Pharmaceutical Association.

Leaving the introduction, we come to the course of study proper.

Part I, we are told by the author, covers the whole field of physics, but "only such as have a special interest to the student of pharmacy are treated at any length."

Part II is devoted to chemistry, and a large number of the symbolic formulas have been printed in two colors. This has not been a mechanical success,

and will necessarily be a source of confusion to the student, when he sees the red negative radical situated at all kinds of angular distances from its positive associate. Besides, it is a pity to teach a beginner the dualistic idea in nomenclature, when he will have it to unlearn if he ever gets at the foundation of the subject.

Part III presents definitions of such general terms as medicines, drugs, pharmacopœia, pharmacy, etc., and one chapter consists of a review of the various classes of chemical constituents existing in plant drugs.

Part IV discusses pharmacy in 136 pages, and it may be said of it, as of each one of the other parts, that it is too small a space in which to consider such a large subject.

There are on the market now a number of series of books under the general title of "aids," "compends," etc., and, if we leave out the introduction of this book, it belongs in the same category with them. It is just such a work as the would-be pharmacist seizes with the forlorn hope of making a short cut into the ranks of the pharmaceutical profession without an education. He will be doomed to disappointment in the book before us, however, for a large part of it would be absolutely incomprehensible to a young man who had not had at least several months of store experience.

A DICTIONARY OF CHEMICAL SOLUBILITIES, INORGANIC. By Arthur Messinger Comey, Ph.D. Macmillan & Co., London and New York. 1896. Received from John Wanamaker, Philadelphia. Price, $5. Pp. 515.

No book on this subject has appeared since the publication of Storer's Dictionary of Solubilities of Chemical Substances, in 1864.

Such a work is largely a labor of love, and Dr. Comey deserves the gratitude of chemists and pharmacists for his unselfish devotion to the subject. He has been unable to verify the figures; that would be a physical impossibility; so he has, as far as possible, quoted all the reliable authorities, although in some cases quite contradictory results have been obtained and recorded by different investigators.

For the data previous to 1860 considerable use has been made of the above-mentioned Storer's Dictionary, and, to obtain those since that time, the author has consulted a large number of authorities. The work has been brought up to March, 1894. The appendix contains formulas and tables for the conversion of the degrees of various hydrometer scales into specific gravity, and a synchronistic table of the periodicals to which references are most frequently made.

TECHNOLOGY QUARTERLY AND PROCEEDINGS OF THE SOCIETY OF ARTS. Massachusetts Institute of Technology. Boston, December, 1895.

This valuable publication has, in the last four numbers, given space to a "Review of American Chemical Research," under the direction of Dr. A. A. Noyes, of the Institute. It is more complete than anything of its kind that has heretofore appeared on this subject, and cannot but be of value to every one who tries to keep pace with the progress made in the science of chemistry in this country.

VIERTELJAHRESSCHRIFT ÜBER DIE FORTSCHRITTE AUF DEM GEBIETE DER CHEMIE DER NAHRUNGS- UND GENUSSMITTEL. 1895. Heft 4.

ANNALES DE CHIMIE ANALYTIQUE is the title of a new semi-monthly from Paris. It is under the direction of C. Crinon, assisted by a well-known corps of collaborators. The first numbers contain valuable analytical contributions, and indicate a useful future.

ARCHIV FOR PHARMACI OG CHEMI. A. Kloecker, editor, Copenhagen, Denmark. The fifty-third volume appears in an enlarged and otherwise improved garb. This journal was begun in 1844, by S. M. Trier, who conducted it for fifty years (to 1894), and, with the exception of the last three years, entirely alone.

Of original articles it shows very few, often for years none. It was and is chiefly a "repertory" of pharmacy, chemistry, physics and applied chemistry.

The new editor has infused more life into it.

That pharmacy in Denmark is by no means behind times is shown by two advertisements: "Situations wanted. A lady (twenty years of age) who has been apprentice for eighteen months, desires a situation in another part of the country so that she can finish her studies."

Four female apprentices are in want of situations. H. M. W.

KORT OVER DENMARK'S APOTHEKER. List of Danish pharmacies, accompanied by a map, showing the location.

We learn that Denmark has 81 "real" pharmacies, 88 "personal," 7 branch stores, 160 physicians who may sell medicines, 11 physicians who are permitted to dispense their own medicines but not keep store (both of the latter are bound to take their medicines from one or more designated pharmacies), and, finally, 10 general stores where medicines may be sold, except poisons and potent drugs and preparations, but they must not put up medicines.

The chief difference between the "real" and "personal" pharmacies (or rather, privileges) is that the former represent valuable pieces of property and may be sold, often at quite fancy prices, while the "personal" cannot be sold, but are merely permits to locate and conduct a pharmacy in a certain place, which permit expires with the death of the widow. The would-be successor has to petition the proper authority for a new permit, which may or may not be granted him. In such cases the fixtures and stock are sold as any other store, at invoice. The widow has to put the store in charge of a graduate in good standing, unless she herself happens to be a graduate. H. M. W.

UEBER DIE ANWENDUNGEN DER GUAJAKHARZ-LÖSUNG (GUAJAKTINCTUR) ALS REAGENS. Von Ed. Schär.—Although this interesting communication was published some time ago, this is the first copy to reach us in the form of a separate reprint.

BEITRÄGE ZUR CHEMISCHEN KENNTNISS DER PFEFFERFRUCHT. Von F. E. Bauer und A. Hilger.

This is the most notable paper in the April issue of *Forschungs-Berichte.*

BRAZILIAN AND COLUMBIAN IPECACUANHA. By Dr. B. H. Paul and A. J. Cownley. Reprint from *Pharmaceutical Journal*, April 25, 1896.

SEMI-ANNUAL REPORT OF SCHIMMEL & CO. (Fritzsche Brothers), Leipzig and New York. April, 1896.

LIST OF PUBLICATIONS OF THE U. S. DEPARTMENT OF AGRICULTURE, from 1841 to June 30, 1895, inclusive. Government Printing Office. Washington. 1896.

CONTRIBUTIONS FROM THE U. S. NATIONAL HERBARIUM. Vol. III. No. 7. Issued April 1, 1896. By John M. Coulter. This consists of a "Preliminary Revision of the North American Species of Echinocactus, Cereus and Opuntia." Washington. 1896.

UEBER EINE EIGENTHÜMLICHE NEUE MAGNESIUM-VERBINDUNG, and UEBER EINE NEUE BILDUNGSART DES MAGNESIUM NITRIDES (Stickstoff-Magnesium), both by Dr. J. M. V. Sztankay, Bath, Hungary, and reprinted from *Pharmaceutische Post.*

MINNESOTA BOTANICAL STUDIES. Bulletin No. 9. Part VIII, with three plates. April 30, 1896. Conway MacMillan, State Botanist.

SOUVENIR OF THE TWENTY-SIXTH ANNUAL MEETING OF THE NATIONAL ECLECTIC MEDICAL ASSOCIATION, to be held in Portland, Ore., June 16 to 19, 1896. Handsomely illustrated.

COMPLETE CATALOGUE OF THE PRODUCTS OF THE LABORATORIES OF PARKE, DAVIS & CO. Detroit. Revised February 25, 1896.

MINUTES OF THE PHARMACEUTICAL MEETING.

The last of the present series of Pharmaceutical Meetings was held in the Chemical Lecture Room of the College, May 19th, at 3 o'clock, with Mr. Wm. McIntyre in the chair.

The reading of the minutes of the previous meeting was omitted.

A number of interesting specimens were exhibited, which may be enumerated as follows: Two samples of gum products of the mesquite tree, one an exudation of Opuntia fulgida and one from Larrea tridentata, all of which were presented by Professor James W. Toumey, of the University of Arizona; a specimen of asparagus, illustrating the peculiar form of growth known in botany as fasciation, and produced apparently in this case by the lateral union of several stems, was presented by Dr. Charles Schäffer; two specimens of fish sounds, of rather large size and somewhat unusual in appearance, were presented by Messrs. Wm. R. Warner & Co.; and Mr. Charles Bullock presented a valuable piece of apparatus intended for the purpose of treating substances with gas with the application of heat. It consists of a small iron retort having a detachable lid, which is closely fitting and clamped when in use. Two brass tubes are adjusted to the lid, one for conducting the gas to the substance treated and the other for carrying off the products. An important application of the apparatus will be for the generation of oxygen in experiments by laboratory students.

A vote of thanks was tendered the donors of the specimens.

The first paper on the programme was presented by Mr. Wm. B. Thompson, and was entitled, "A History of Dover's Powder." (See page 337.) The author emphasized the necessity of preserving data which may become of historical value, and not only related the origin of this drug, which has been

highly esteemed as a therapeutic agent for more than two centuries, but also gave an interesting biographical sketch of its originator, Dr. Thomas Dover, who at one time during his career was engaged as a buccaneer.

In the discussion which followed the reading of the paper, Mr. Thompson stated that potassium sulphate is probably to be preferred to sugar of milk as a diluent for Dover's powder on account of the trituration required to reduce it to a fine state of division. Mr. E. M. Boring referred to Squibb's process for this preparation, which consists in reducing to powder crystals of sugar of milk, opium and ipecac roots by grinding them together.

Mr. Charles H. LaWall read the second paper, the subject of which was "A Method of Assay for Sanguinaria and Its Preparations." (See page 305.) Four modifications of the general assay processes now coming into use were employed by the author, with the conclusion that, working upon a practical scale, the benzin process gives uniform results with a given sample of the drug, and may be used for standardization. The process formulated by him is as follows:

	Grammes.
Drug (No. 50 powder)	10
Petroleum benzin	100
Aqua ammoniæ	10

Macerate for four hours with frequent agitation; then add 5 grammes additional of aqua ammoniæ; shake well and separate the quantity required for assay, the final extraction of the alkaloid being effected by the use of heavy chloroform ether (chloroform 3 volumes, ether 1 volume). The conclusion was also reached that 1·50 may be considered the average alkaloidal per cent. of the commercial drug. Samples of the chloride of the alkaloids of sanguinaria prepared by the author were shown.

A paper, entitled "The Pharmacopœial Standard," was contributed by Prof. J. U. Lloyd, of Cincinnati, O. (See page 297.)

The author is of the opinion that a large number of the exacting pharmacopœial descriptions should be modified, and considered a number of official compounds, dividing them into three classes:

In the first class he placed those substances which rapidly deteriorate, and showed how they might be fully up to the standard when freshly prepared, but fall below it within a short time. The second class embraced such substances as are demanded of a strength by the Pharmacopœia that renders their production impractical or unnecessarily expensive. In the third class were included such substances as are used largely in the arts and the demands of commerce, and which the necessities of manufacture or custom have established of a different quality from the official standard.

The writer concludes with the belief that a scale of reasonable variations should be affixed to every official preparation.

This paper elicited considerable discussion.

Mr. Thompson remarked that those entrusted with the administration of the laws are filled with zeal, and construe them too literally and rigidly, but that the final outcome of the difficulties will be the establishment of more rational standards, and that interest will be centered upon this work and not upon litigation as at the present time.

The chairman held a similar view of the matter, and said that the main difficulty lay in the prosecution of ideas, rather than the consideration of principles of equity.

"The Tannins of Some Ericaceæ" was the subject of a paper presented by Miss Bertha L. DeGraffe. (See page 313.) In her work the author investigated the following drugs of the natural order Ericaceæ: Uva ursi, gaultheria, chimaphila, manzanita, mountain laurel and trailing arbutus. The tannins were extracted from the drugs with acetone, and, after a series of preliminary manipulations to purify them, qualitative tests were made with the customary reagents, to determine to which tannin group (the gall tannin or oak bark tannin group) the principles so obtained belong, but with not wholly satisfactory results. Decompositions were then attempted for the same purpose, but with like results. As a final means of classification, ultimate analyses of the principles were made. The results showed the tannins of uva ursi and manzanita to have the same percentage composition as gallotannic acid, and those of gaultheria, trailing arbutus and mountain laurel to belong to the oak bark group. The tannin of chimaphila was found difficult to purify, but the author was of the opinion that it belongs to the oak bark group. Samples of the purified tannins from the drugs previously mentioned were exhibited.

Prof. Henry Trimble contributed the last paper, which was entitled "Recent Literature on the Soja Bean." (See page 309.) The author stated that soja bean and its products constitute an important proportion of the food of the inhabitants of India, China and Japan, its richness in proteids supplying the deficiency of these bodies in the principal food, which is rice. Recent analyses show it to contain as high as 42·05 per cent. of crude protein and 20·46 of fat. It also contains an active diastatic ferment, which is said to have a powerful action upon starch. The principal products of the bean are *miso*, which is made by subjecting the steamed beans after cooling to the action of a diastatic ferment made from rice or barley; *natto*, which is made by submitting boiled beans to a warm temperature for 24 hours, whereby a decomposition of the proteids is effected; and *tofu*, which is a form of vegetable caseine. Attention was called to a sample of the beans purchased in New York City, which, in the dry condition, more nearly resemble peas than beans.

An attractive feature of the meeting was an exhibition of lantern slides of botanical subjects, and photographic views along the line of the Canadian Pacific Railway, by Dr. Charles Schäffer, of this city. These views were projected on a screen by means of an electric lantern, and were of popular interest as well as scientific character.

A unanimous vote of thanks was tendered Dr. Schäffer for the entertainment furnished by him, and to Professor Trimble for having procured his services.

On motion, the meeting adjourned.

THOS. S. WIEGAND,
Registrar.

It has been decided to offer a reduction of 50 per cent. on the price of all Proceedings of the American Pharmaceutical Association prior to 1891. The Reports of 1856 and 1859 are out of print and none were published in 1861. Orders should be addressed to Prof. Charles Caspari, Jr., 109 Asquith Street, Baltimore, Md.

OBITUARY.

CHARLES O. CURTMAN.

The record of Dr. Curtman's life is that of a man who was constantly striving and achieving. Born in Giessen, Germany, in 1829, he acquired a thorough classical education and then turned his attention to chemistry. He was a pupil of Liebig and afterwards an assistant of Knapp, the technologist.

In 1849 he decided to go to America, and, after arriving in New York, he slowly made his way to New Orleans, where he engaged in the drug business.

At the beginning of the war, Dr. Curtman became surgeon in the Confederate service, but later became the director of the laboratories to manufacture gunpowder and other products for the Confederate army.

Soon after the war he reached St. Louis, where he assisted in establishing what is now the Missouri Medical College, and in which he held the chair of chemistry until the time of his death. He also held for eleven years the professorship of chemistry in the St. Louis College of Pharmacy.

Dr. Curtman became a member of the Committee of Revision of the U. S. Pharmacopœia in 1890. His contributions to science have been quite numerous, most of his later researches being on subjects connected with pharmacopœial revision. His most popular work was his "Lessons in Qualitative and Volumetric Chemical Analysis," which included Dr. F. Beilstein's "Lessons in Qualitative Analysis." This work is now in its fourth edition. Another valuable work was that on "Uses, Test for Purity and Preparation of Chemical Reagents," which required for its production a great amount of patient research on the part of the author.

Dr. Curtman died on April 22, 1896, after ten days' illness.

The St. Louis College of Pharmacy has recently adopted the following resolutions of respect:

Resolved, That it is with deep sorrow that we record the death of Dr. Chas. O. Curtman, who was for eleven years a member of this Association, and who, in the chair of chemistry, was one of its most successful teachers and did much in building up the reputation of the College.

Resolved, That in him whose loss we lament we recognize one who has wielded a wide influence, because of his ability and aptness in his chosen vocation; one who has done much to disseminate knowledge, awaken thought and encourage the scientific spirit.

Resolved, That we recognize with pride the work in medical and pharmaceutical chemistry which has given him an international reputation, and which we, as fellow-citizens of St. Louis, in a small measure, share with him.

Resolved, That while the industry, patience and thoroughness with which he has pursued his investigations in many branches of science has challenged our admiration, we also bear testimony to the many good personal qualities which have attached him to us as a friend.

Resolved, That these resolutions be spread upon the records of the College, be furnished the pharmaceutical press for publication, and that an engrossed copy be transmitted to the family.

CHAS. GIETNER, *President.*
J. C. FALK, *Secretary.*

NOTES AND NEWS.

Prof. Francis Hemm has been elected to fill the position of professor of chemistry in the Missouri Medical College, St. Louis, vacant on account of the death of Dr. Charles O. Curtman. Professor Hemm at present holds the position of director of the pharmaceutical laboratories in the St. Louis College of Pharmacy.

Dr. B. H. Paul and A. J. Cownley have recently contributed an article on the comparative value of *Brazilian and Columbian ipecacuanha*.[1]

The question as to the relative medicinal value of the two kinds of ipecac now met with in commerce has acquired greater importance since the pharmacological observations conducted by Dr. Wild[2] have shown that there is a well-marked difference between the effects produced by the two bases, emetine and cephaeline, which are present in these drugs in different relative proportions.

According to Dr. Wild's observations, emetine is a good expectorant, but cephaeline does not appear to be equal to it in this respect, while on the contrary, cephaeline is undoubtedly superior as an emetic.

The authors determined the mixed alkaloids by extracting the drug with amylic alcohol, removing them from this solvent with dilute sulphuric acid, adding to the latter excess of ammonia and shaking out with ether. The alkaloids were separated by dissolving in hydrochloric acid, adding sodium hydrate in excess and shaking with ether.

The separated ether solution was acidified and again treated with sodium hydrate, this operation being repeated until the cephaeline was sufficiently removed, which was ascertained by the absence of precipitate on adding ammonium chloride to the alkaline liquor. After the separation was effected, the ether solution of emetine was evaporated and the residue titrated with semi-normal hydrochloric acid (1 c.c. semi-normal HCl = 0·124 emetine).

From the alkaline soda liquid cephaeline was precipitated, by the addition of ammonium chloride, and shaken out with ether. The residue left after evaporating the ether was titrated as above (1 c.c. semi-normal HCl = 0·117 cephaeline).

From a careful examination of selected samples of Brazilian and Columbian ipecac, the authors have obtained the following results :

	Brazilian.		Columbian.
	Root.	Stem.	
Emetine	1·45	1·18	0·89
Cephaeline	0·52	0·59	1·25
Third base	0·04	0·03	0·06
Total	2·01	1·80	2·20

[1] *Pharmaceutical Journal*, **56**, 321.

[2] *Pharmaceutical Journal*, **55**, 435.